ANNUAL MEETING: LIVERPOOL AND SOUTHPORT, JULY 13—21, 1950

MEDICAL LIBRARY

JUL 21 1950

BRITISH MEDICAL JOURNAL

JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

SATURDAY JULY 1 1950

TABLE OF CONTENTS

Inoculation and Poliomyelitis A. BRADFORD HILL, D.SC., Ph.D., and J. KNOWELDEN, M.D., D.P.H. ..1
Poliomyelitis and Inoculation of Prophylactics F. O. MACCALLUM, M.D. ..6
Antimalarial Drugs in West Africa LEONARD J. BRUCE-CHWATT, M.D., and JOAN M. BRUCE-CHWATT ..7
The Dumping Syndrome THOMAS O'NEILL, M.Ch., F.R.C.S. ..15
Cause and Management of Failed Forceps Cases H. DEREK FREETH, M.B., M.R.C.O.G. ..18
Rectal Thiopentone in Children JOHN LORBER, M.B., M.R.C.P., D.A. ..21
Convulsions in Childhood T. W. BUCHAN, M.B., F.R.F.P.S. ..22

MEDICAL MEMORANDA

Intestinal Obstruction during Late Pregnancy Caused by Volvulus of Sigmoid Colon. D. W. JAMES, M.B., B.S., M.R.C.O.G. ..24
Aerocele. J. H. MCINTYRE, M.D. ..25
Large Post-rectal Dermoid. RAYMOND PURVIS, F.R.C.S. ..25

REFRESHER COURSE

Cardiac Neuroses. PAUL WOOD, O.B.E., M.D., F.R.C.P. ..33

GENERAL ARTICLES AND NEWS

Education of the Public Concerning Cancer. MALCOLM DONALDSON, F.R.C.S., F.R.C.O.G. ..35
GENETICAL STRUCTURE OF POPULATIONS ..36
The Royal College of Surgeons of England. W. R. LEFANU, M.A. ..37
NATURAL HISTORY OF SURGICAL INFECTION 39
HOSPITAL MORALE ..41
NUFFIELD FOUNDATION ..42
NOVA ET VETERA ..43
MEDICAL NOTES IN PARLIAMENT ..53
UNIVERSITIES AND COLLEGES ..55
THE SERVICES ..55
MEDICAL NEWS ..57
BIRTHS, MARRIAGES, AND DEATHS ..58
QUESTIONS AND COMMENTS ..59

REVIEWS

The Importance of Burns ..26
A Veteran Gynaecologist ..26
Changing Views on Rheumatism ..26
Examination of the Nervous System ..27
Books Received ..27

LEADING ARTICLES

Inoculation and Poliomyelitis ..28
Paralysis Agitans ..29

ANNOTATIONS

Immunity to Diphtheria ..30
Progress in Isotope Production ..31
Local Chemotherapy of Tuberculosis ..31
Bacterial Polysaccharides for Cancer ..32

REPORTS OF SOCIETIES

ROYAL SOCIETY OF MEDICINE: Treatment of Obsessional Neuroses ..43
SOCIETY FOR THE STUDY OF FERTILITY ..44

OBITUARY

W. R. Dawson, O.B.E., M.D., F.R.C.P.I. ..51
W. I. Gordon, M.B. ..51
A. de W. Snowden, C.B.E., M.D. ..52
K. C. L. Paddle, M.C., M.R.C.S., D.P.M. ..52
D. W. Daniels, M.D., F.R.C.S. ..52
A. E. Phillips, M.B. ..52

SUPPLEMENT

The Secretary Reports ..1
The World Medical Association. J. A. PRIDHAM, M.C., M.R.C.S. ..2
GENERAL MEDICAL SERVICES COMMITTEE ..3
G.M.S. SUBCOMMITTEE (SCOTLAND) ..4
A.R.M.: MOTIONS AND AMENDMENTS ..4
CORRESPONDENCE ..10
H.M. FORCES APPOINTMENTS ..12
ASSOCIATION NOTICES ..12
ANNUAL MEETING ..12

CORRESPONDENCE

Aminopterin for Leukaemia. JAMES INNES, M.D. ..46
The Cerebrospinal Fluid in Intracranial Otogenic Abscess. J. W. D. BULL, M.D.; N. ASHERSON, F.R.C.S. ..46
Hodgkin's Disease and Pregnancy. L. H. WALTER, M.B. ..47
Obstetrical Anaesthesia. A. H. MOSLEY, M.B. ..47
Early Rising for Puerperal Women. ALLAN B. SWARBRECK, M.R.C.O.G. ..47
Brachial Neuralgia. I. H. MILNER, M.R.C.S. ..48
Scarlet Fever, Rheumatic Fever, and Acute Nephritis. T. C. MACDONALD, M.D. ..49
Treatment of Tropical Ulcers. M. ZWIERZ, M.D. ..49
Blood Loss at Operation. EARLE HACKETT, M.B. ..50
Medical Administration in the Tropics. E. J. and I. BARNES ..50
Separation of Umbilical Cord before Delivery. ANNIE SYDENHAM, M.R.C.S. 50
Nocturnal Enuresis. A. SINTON, M.R.C.S. 50
Some Effects of Polarized Light on Vision. A. STANWORTH, M.B., and E. J. NAYLOR, M.SC.TECH. ..50
Treatment of Obesity. A. LEWIS, M.R.C.S. 51

MEDICO-LEGAL

Vesting of Maternity Home in the Minister ..55

Epidemiology Section ..56

BRITISH MEDICAL ASSOCIATION, TAVISTOCK SQUARE, LONDON, W.C.1

No. 4669, WEEKLY, PRICE 2/-

Copyright

REGISTERED AS A NEWSPAPER

610.5
B86
M.5

British Medical Association Annual Meeting—Liverpool 1950

THE DIRECTORS OF
EVANS MEDICAL SUPPLIES LTD
extend a cordial invitation to
Members of the Medical Profession to a
SCIENTIFIC CONVERSAZIONE
on Thursday, 20 July, 1950. 2.30 p.m. — 5.30 p.m. at
The Evans Biological Institute · Runcorn · Cheshire

A special train will leave Liverpool (Lime Street) at 2.10 p.m. returning from Runcorn at 6 p.m.
Tickets for the train (limited in number) can *only* be obtained from the B.M.A. Registration Office in St. George's Hall; programmes will also be available at the same time.

290

EVANS MEDICAL SUPPLIES LTD LIVERPOOL AND LONDON

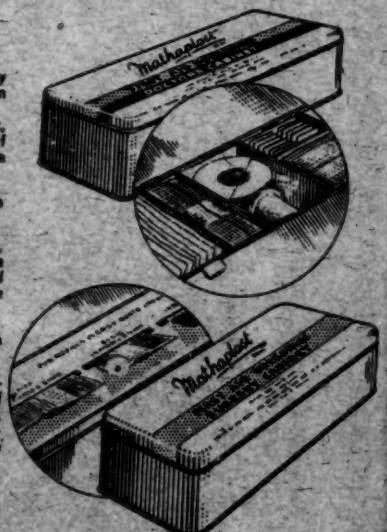
. . . *so much better*

PLAYER'S No. 3
The Quality Cigarette

[3P 99b]

Mathaplast REG'D **FIRST AID DRESSINGS**
IN CONSULTING ROOM CABINETS

The medicated centres of Mathaplast Elastic Adhesive First-Aid Dressings are now impregnated with 5-Aminoacridine hydrochloride. This can be considered an important advance in that clinical trials have conclusively shown that 5-Aminoacridine hydrochloride possesses properties which strongly recommend its use as a general antiseptic.



Obtainable in attractively designed consulting room cabinets.
Mathaplast Doctors' Cabinet, containing an assortment of Mathaplast Elastic Adhesive First-Aid Dressings.
Complete Cabinet 15/4 each

Mathaplast Surgery Cabinet, containing 1 yard each of the 1½ in., 2½ in., and 3 in. sizes of Mathaplast Elastic Adhesive Strip Dressing.
Complete Cabinet 8/9 each

William Mather, Ltd., are manufacturers of a complete range of Medical and Surgical Plasters, including the progressively popular Mathaplast Elastic Adhesive Bandages.

Further particulars and literature available from:
WILLIAM MATHER LIMITED
DYER STREET, CHESTER ROAD, MANCHESTER, 15
(Plaister makers since 1826)

medical
Hygn

BRITISH MEDICAL JOURNAL

LONDON SATURDAY JULY 1 1950

INOCULATION AND POLIOMYELITIS

A STATISTICAL INVESTIGATION IN ENGLAND AND WALES IN 1949

BY

A. BRADFORD HILL, D.Sc., Ph.D.
Professor of Medical Statistics

AND

J. KNOWELDEN, M.D., D.P.H.
Lecturer in Medical Statistics

London School of Hygiene and Tropical Medicine

The immunization campaign which began in 1942 has led, it is well known, to a dramatic reduction in the incidence of and mortality from diphtheria in this country. During its progress, however, there have been reported occasional and sporadic cases of paralysis following the injection of an antigen. This paralysis has sometimes been limited to the limb in which the injection was made; sometimes it has involved other limbs as well. In most cases a diagnosis of poliomyelitis has been made. It is, however, clear that when inoculations are being given to hundreds of thousands of children and when, at the same time, poliomyelitis is endemic or epidemic, then the disease must *inevitably* follow injections in some children without there being any causal relationship whatever between the two events. In other words, children receiving injections might have no more risk of acquiring paralytic poliomyelitis than any other children.

There was in those earlier years no evidence to suggest that they had a greater risk—and, indeed, we do not now know for certain that the danger then existed, though we may well suspect that it did. In the autumn of 1949, on the other hand, it was known that much more incriminating evidence was accumulating in several quarters, evidence which has since been published. J. K. Martin (1950) had collected 17 cases in which paralysis of a single limb had occurred within 28 days of an injection being given. The diagnosis in almost all was poliomyelitis. No statistical proof of the relationship was available, but it appeared very unlikely that the association was wholly fortuitous.

At the same time it was known that observations of the association had been made, and statistical evidence of cause and effect collected, by B. P. McCloskey (1950) working in Melbourne, Australia. Of 340 cases of poliomyelitis investigated by him 31 had received an injection of diphtheria toxoid or pertussis vaccine, alone or in combination, within three months of the onset of their symptoms. In these 31 patients paralysis was distinctly more frequent in their inoculated than in their uninoculated limbs. Likewise in the 17 of them who were under 3 years of age and had received an inoculation within the preceding 35 days, the severity of the paralysis was much greater in the last inoculated limbs than in a comparable group of children not recently inoculated.

Concurrently, D. H. Geffen (1950) had become aware of the occurrence of poliomyelitis in recently inoculated children in the Metropolitan Borough of St. Pancras, an observation which he subsequently extended by the collection of records from other parts of London. Once more the frequency of the occurrence and the tendency for the paralysis to be localized to the limb of injection made it somewhat unlikely that the association was fortuitous.

These reports, at that time incomplete and unpublished, made it essential that a wide-scale statistical inquiry be immediately undertaken, one which could reveal as speedily as possible whether indeed in this country there was a case for believing that paralytic poliomyelitis could be justly attributed to a preceding inoculation.

Mode of Inquiry

For a full answer to the statistical problem the requirements are the numbers of children of given ages injected with defined antigens at given points of time and in specified areas, and then the number of these who develop poliomyelitis within subsequent periods. In relation to the general incidence of poliomyelitis, these figures will accurately measure the probability that an inoculated child will develop poliomyelitis and, likewise, they will show the relative risks at different ages and with different antigens. Such a method is the *only* means by which those risks can be satisfactorily and effectively measured. It is an inquiry, however, that would take a very long time to carry out, since there are no readily available data which give, in the required detail, the numbers of children inoculated. In the circumstances it was essential to use a speedier, even if less comprehensive, approach.

Areas of Inquiry

The method we adopted was to choose deliberately all those administrative areas of the country in which a large number of cases of poliomyelitis had been notified during the three months July, August, and September, 1949 (the number we laid down was 20 of all ages). We then sought the inoculation histories of all the cases of poliomyelitis in which the patient was less than 5 years of age. This procedure led us to seek for returns from 25 areas. It soon, however, became apparent that these areas were unlikely to provide sufficient data for all the subdivisions

we wished to make. At the same time, the epidemic of 1949 was unexpectedly prolonged beyond the usual season of poliomyelitis. We therefore sought data from another 14 areas in each of which at least 20 cases of all ages had been notified in the five months July to November inclusive.

From these 39 areas we subsequently eliminated the following: three areas (involving 21 records) which could not provide the detailed data that we essentially needed —the inoculation histories of the children were not known or the site of inoculation or of paralysis was lacking; one area which had had only abortive and doubtful cases (9 records); one area in which the recorded incidence of 20 cases, upon which it was selected, related mainly to cases brought into the town's hospitals from rural areas outside it and which itself had had only a single case in a child under 5 years of age (one record); and one area in which the records of paralysis available related not to the early stages of the disease but to the residual paralysis some weeks later (8 records).*

Excluding these 39 records we were left with 410 records derived from 33 widespread areas (the Metropolitan Boroughs of Battersea, Hackney, Hammersmith, Islington, Kensington, Lewisham, Paddington, St. Pancras, and Wandsworth; the County Boroughs of Birmingham, Bournemouth, Brighton, Bristol, Dewsbury, Hull, Leeds, Leicester, Liverpool, Manchester, Nottingham, Portsmouth, Reading, Salford, Sheffield, Southampton, and York; the Municipal Boroughs of Finchley, Hendon, Hornsey, and Willesden; the Urban Districts of Camborne and Redruth, and Hoyland Nether; and the Rural District of New Forest).

The Protocols

The medical officer of health of each of these areas was asked to provide two series of data, the one relating to the confirmed poliomyelitis cases, limited to children under 5 since inoculation at older ages is less frequent, and the other to a series of "controls." For the former we sought sex; date of birth; date of notification of poliomyelitis and date of onset of symptoms; whether there was paralysis and, if so, which limbs or other sites were affected and whether the attack was fatal; and then the child's full history of inoculations (excluding vaccination) from the time of his or her birth up to September 30, 1949, in the first series of areas and to November 30, 1949, in the second series. Under this history we sought the date of each injection, the dose, site, whether subcutaneous or intramuscular, the nature of the vaccine and its origin.

From these particulars we could see how frequently the site of paralysis coincided with the site of injection at given intervals of time after that injection, and also whether the incidence of paralysis on the various limbs, upper and lower, differed in its distribution between those children (of the same age) who had been recently inoculated and those who had not.

The Controls

As a further standard of comparison we sought a control group of children under 5 years of age—one which would be representative of all such children in the area concerned. By such means we might see whether the poliomyelitis patients had been recently inoculated more often than the general run of children—that is, whether inoculation appeared to be bringing them into the paralytic class. A method of choosing these controls in so many areas and yet by some random process was not easy. We finally determined to ask the medical officer of health to take for each of his poliomyelitis cases a child of the same sex as that case and of closely similar age, but one who was notified at approximately the same date as the poliomyelitis case as suffering from measles. Failing this we asked him to take for each poliomyelitis case a child of the same sex who was born at the same time as the poliomyelitis case, the name to be drawn from the notification of births register.

To the "measles control" there might be objection in that we have to presume that children suffering from measles at ages under 5 are, in relation to the incidence of inoculation, a cross-section of all children of those ages. The "birthday control" presented some difficulty in that the child chosen had to be known to be still living in the area concerned. Difficulty also arose through the dearth of cases of measles at that time of year in 1949. Many such cases we subsequently had to discard since they did not match closely enough in age and date of notification the poliomyelitis case they were supposed to control. We were thus left finally with only 164 controls derived from one or other of the above methods, each of which had been closely "paired" with a corresponding poliomyelitis case.

In obtaining these various data we asked the medical officer of health to take the following precautions: "(*a*) to ensure that the evidence may be wholly objective, and therefore not open to criticism, it is most important that, whenever possible, *the details of the attack of poliomyelitis should be entered before the inoculation history of the child has been determined*; (*b*) the 'control' case of measles to a poliomyelitis case should be chosen to give, as near as can be, equality in sex, age, and date of notification, but otherwise be picked at random and *particularly, if possible, without any* prior knowledge of the child's inoculation history."

The Results

The basic data relating to the 410 cases of poliomyelitis are set out in Table I. They relate, it will be seen, to 248 boys and 162 girls, with the maximum incidence falling in the second and third years of life. It may also be observed that the number of sites of paralysis in these young children declines steadily with advancing age. This is due, at least in part, to an increasing frequency of non-paralytic cases as age rises—whether as a real phenomenon or through a greater frequency of missed cases very early in life. The incidence of such non-paralytic attacks was 5.4% of all cases in the first year of life, 6.7% in the second year, 11.7% in the third, 15.5% in the fourth, and 25% in the fifth. In total, it will be seen, these 410 children were paralysed in 645 sites.

TABLE I.—*Number of Children with Poliomyelitis, the Number of Sites of Paralysis, and the Inoculation Histories*

Age at Onset of Poliomyelitis (Months)	No. of Children			No. of Sites of Paralysis and (Mean No. per Child)	Inoculation History		
	M	F	Total		Inoculated at Some Time	Not Inoculated	Not Known
0— ..	32	24	56	103 (1·8)	18	37	1
12— ..	75	44	119	204 (1·7)	82	27	10
24— ..	70	33	103	166 (1·6)	65	27	11
36— ..	45	39	84	123 (1·5)	61	17	6
48–59 ..	26	22	48	49 (1·0)	23	12	13
Total	248	162	410	645 (1·6)	249	120	41

*We also excluded from the present analysis four records sent to us from Belfast through the kindness of Dr. James Boyd and Dr. F. F. Kane, to whom we express our thanks.

Site of Paralysis and Previous Inoculation

In Tables II and III we turn to the main issue, our first comparison being between the sites of paralysis revealed by recently inoculated children and by others not so recently inoculated. Table II gives the figures for children under 2 years and Table III those for children aged 2–5. Looking first at the younger children (Table II) and at those without any history of previous inoculations, the percentage distribution of paralysis shows (column 4) that the two arms are almost equally affected—11% and 12%—and that the two legs also do not differ greatly—31% and 26%. On the other hand, the legs are paralysed about two and a half times as often as the arms—57% to 23%. Turning next to column 3, it will be seen that children who had been inoculated at least three months before the onset of their attack of poliomyelitis give remarkably similar figures—arms 10% and 13%, legs 25% and 30%, ratio of legs to arms 55% to 23%. There is clearly no indication whatever that an injection three or more months previous to the illness affects the distribution of paralysis.

TABLE II.—*Sites of Paralysis and Previous Inoculation History in Children Under 2 Years of Age*

Site of Paralysis	Interval Between Last Injection and Onset of Poliomyelitis: Less than a Month*	Between 1 and 3 Months	3 or More Months Previous	No Previous Inoculations	Inoculation History Not Known	Total
Right arm ..	15	1	8	12	2	38
Left arm	23	6	10	14	3	56
Right leg	17	9	20	35	1	82
Left leg	15	5	24	29	1	74
Trunk	9	2	12	10	1	34
Cranial nerves ..	3	0	6	13	1	23
Total No. of (*a*) Sites ..	82	23	80	113	9	307
(*b*) Children ..	35	16	49	64	11	175
	Percentages					
	(1)	(2)	(3)	(4)	(5)	(6)
Right arm ..	*18*	*4*	*10*	*11*	—	*12*
Left arm	*28*	*26*	*13*	*12*	—	*18*
Right leg	*21*	*39*	*25*	*31*	—	*27*
Left leg	*18*	*22*	*30*	*26*	—	*24*
Trunk	*11*	*9*	*15*	*9*	—	*11*
Cranial nerves ..	*4*	*0*	*7*	*11*	—	*8*
Total sites ..	*100*	*100*	*100*	*100*	—	*100*

* Here and in all tables less than a month means 0–28 days inclusive, between 1 and 3 months is 29 to 91 days inclusive, and 3 or more months is 92 days and onwards.

Turning, however, to column 1 we see a material change. Of the 82 sites of paralysis recorded for these 35 recently injected children the right arm was involved in 18%, the left arm in 28%. Both these proportions are distinctly greater than those shown by the uninoculated or not recently inoculated children (of columns 3 and 4), and together they give to the arms 46% of the paralysis against the 23% in the arms of the latter groups. Also the left arm in these children is affected more often than the right, and the left arm is, it is known, the more usual site of inoculation in this country. (Taking, in fact, these hundred children aged 0–2 as one group we find 85% had been inoculated in an arm against 9% in the leg and 4% in the buttocks (2% unknown site), and the ratio of left arm to right arm is 4½ to 1. The figures for the older children are very similar.) As a corollary of the excess incidence of paralysis in the arms in the recently inoculated group, the legs are proportionately less often affected. In place of the customary ratio of 2½ to 1 for leg paralysis to arm paralysis, we have here a ratio rather less than 1 to 1 (39% legs to 46% arms).

Turning finally to the children injected more than one month but less than three months before the onset of their illness, we have but 16 of these, with 23 sites of paralysis. The number is too small to be convincing. There is perhaps a suggestion of an absence of paralysis in the right arm and an excess on the left, but the arms show 30% in total to the 61% in the legs, a ratio very similar to that found in the uninoculated children.

Turning next to the older children (Table III), we may note once again that those who had been inoculated at least three months before the onset of poliomyelitis reveal almost precisely the same distribution of sites of paralysis as the children who had never been inoculated—arms

TABLE III.—*Sites of Paralysis and Previous Inoculation History in Children Between 2 and 5 Years of Age*

Site of Paralysis	Interval Between Last Injection and Onset of Poliomyelitis: Less than a Month	Between 1 and 3 Months	3 or More Months Previous	No Previous Inoculations	Inoculation History Not Known	Total
Right arm ..	0	1	20	9	5	35
Left arm	2	0	21	9	6	38
Right leg	3	0	52	16	11	82
Left leg	4	2	59	23	10	98
Trunk	1	0	27	14	6	48
Cranial nerves ..	0	0	28	6	3	37
Total No. of (*a*) Sites ..	10	3	207	77	41	338
(*b*) Children ..	7	4	138	56	30	235
	Percentages					
	(1)	(2)	(3)	(4)	(5)	(6)
Right arm ..	—	—	*10*	*12*	*12*	*10*
Left arm	—	—	*10*	*12*	*15*	*11*
Right leg	—	—	*25*	*21*	*27*	*24*
Left leg	—	—	*29*	*30*	*24*	*29*
Trunk	—	—	*13*	*18*	*15*	*14*
Cranial nerves ..	—	—	*13*	*8*	*7*	*11*
Total sites ..	—	—	*100*	*101*	*100*	*99*

20% and legs 54% (column 3), against arms 24% and legs 51% (column 4). The similarity is striking, and confirms the previous conclusion that distant injections produce no changes in the distribution of paralysis.

Of recently inoculated children there were at these ages only seven. This is, of course, due to the fact that inoculations are much less frequently performed at these ages, and the few figures we have are clearly of little value.

Sites of Paralysis and Site of Injection

A closer picture of the association between the site of paralysis and the site of recent injection (whether in arm, leg, or buttock) is given in Tables IV and V. Including

TABLE IV.—*Sites of Paralysis in Relation to Site of Last Inoculation. Children Under 2 Years of Age*

Site of Paralysis in Relation to Site of Inoculation	Interval from Last Inoculation to Onset of Poliomyelitis (Months): 0–	1–	3–	6+	Total
Same site*	11	3	1	1	16
Included site* ..	18	1	3	4	26
Different site ..	3	8	10	24	45
No paralysis ..	1	2	1	1	5
No record	3	2	1	3	9
Total No. of children	36†	16	16	33	101†
% of total falling in same and included categories ..	*81*	*25*	*25*	*15*	*42*

* "Same site" denotes that the site of inoculation was the *only* site of paralysis, "included site" that the site of inoculation was *one* of the sites of paralysis but not the only site in which paralysis occurred.

† The total number of children was 100, and the extra one here is due to the fact that one child was given two antigens on the same day, one into the left arm and the other into the right, and developed paralysis in the right arm 10 days later. We have had, here and elsewhere, to include this child twice.

here only those children who had at some time or other been inoculated, we show how often the site of paralysis coincided with the site of injection. Table IV shows that, of the children who had been inoculated in the month preceding their illness, four-fifths (81%) had paralysis in the limb of injection (though not necessary confined to that limb). This proportion is greatly in excess of the figure shown by children whose last injection was more than a month distant. In these groups the limb of injection was involved in 25% when an injection was one to three months before, 25% when it was three to six months before, and 15% when it was six or more months before (proportions which between themselves differ insignificantly).

TABLE V.—*Sites of Paralysis in Relation to Site of Last Inoculation. Children Between 2 and 5 Years of Age*

Site of Paralysis in Relation to Site of Inoculation	Interval from Last Inoculation to Onset of Poliomyelitis (Months)				
	0–	1–	3–	6+	Total
Same site*	1	0	0	4	5
Included site* ..	3	0	0	10	13
Different site ..	0	2	4	88	94
No paralysis ..	2	1	0	17	20
No record	1	1	1	14	17
Total No. of children	7	4	5	133	149
% of total falling in same and included categories ..	*57*	*0*	*0*	*10*	*12*

* "Same site" denotes that the site of inoculation was the *only* site of paralysis. "included site" that the site of inoculation was *one* of the sites of paralysis but not the only site in which paralysis occurred.

The older children of Table V reveal a similar excess in the very small number who had been recently inoculated. Four of these seven children (57%) had paralysis in the limb of injection, whereas of the large group whose inoculation lay more than six months distant only 10% showed an association of these sites of injection and paralysis (a difference which is technically significant; the "exact" probability test gives P = 0.005).

Comparison of Antigens

Analysis of the figures according to the antigen last injected gives the results set out in Tables VI and VII. Our numbers are small even at the younger ages (Table VI)

TABLE VI.—*Sites of Paralysis in Relation to Site of Last Inoculation With Specified Antigens. Children Under 2 Years of Age*†

Site of Paralysis in Relation to Site of Inoculation	A.P.T.			Combined A.P.T. and Pertussis			Pertussis		
	Interval in Months			Interval in Months			Interval in Months		
	0–	1–	3+	0–	1–	3+	0–	1–	3+
Same site* ..	2	2	2	8	1	—	1	—	—
Included site*	4	—	3	14	1	3	—	—	—
Different site	1	5	24	1	3	7	1	—	2
No paralysis	1	1	1	—	1	—	—	—	1
No record ..	—	1	3	3	1	1	—	—	—
Total No. of children ..	8	9	33	26	7	11	2	—	3
% of total falling in same and included categories	*75*	*22*	*15*	*85*	*29*	*27*	—	—	—

* "Same site" denotes that the site of inoculation was the *only* site of paralysis, "included site" that the site of inoculation was *one* of the sites of paralysis but not the only site in which paralysis occurred.

† Two children not included here had had other antigens more than 3 months previously.

but there is, we think, a clear association here between site of recent injection and site of paralysis with A.P.T. and with the combined vaccine (A.P.T. and pertussis). With the former antigen six out of eight children (75%) had paralysis in the limb of injection; of the more distantly inoculated the numbers were two out of nine children inoculated between one and three months before (22%), and five out of 33 children inoculated three or more months before (15%). The difference between the recently and not recently inoculated groups (one month or over) is more than would be likely to occur by chance (by "exact" probability test P = 0.002).

Similarly with the combined vaccine 22 out of 26 recently inoculated children (85%) show paralysis in the limb of injection, while with more distant inoculations the proportion falls to just under 30% (two in seven and three in 11 children). Again the difference would be unlikely to arise by chance (P less than 0.001). For the pertussis vaccine alone we have no figures of any value. It was clearly not being extensively used in these areas.

At the older ages (Table VII) our data are very few, and the most we can say is that the figures for A.P.T. are in conformity with those for younger children. Of

TABLE VII.—*Sites of Paralysis in Relation to Site of Last Inoculation With Specified Antigens. Children Between 2 and 5 Years of Age*†

Site of Paralysis in Relation to Site of Inoculation	A.P.T.			Combined A.P.T. and Pertussis			Pertussis		
	Interval in Months			Interval in Months			Interval in Months		
	0–	1–	3+	0–	1–	3+	0–	1–	3+
Same site* ..	1	—	4	—	—	—	—	—	—
Included site*	2	—	9	1	—	—	—	—	1
Different site	—	2	76	—	—	6	—	—	5
No paralysis	—	1	14	—	—	1	2	—	2
No record ..	—	—	12	—	—	1	1	—	1
Total No. of children ..	3	3	115	1	—	8	3	—	9

* "Same site" denotes that the site of inoculation was the *only* site of paralysis. "included site" that the site of inoculation was *one* of the sites of paralysis but not the only site in which paralysis occurred.

† Seven children not included here had had other antigens—six of whom were injected more than 3 months previously and one between 1 and 3 months previously.

the 115 children who had been inoculated with this antigen three or more months before the onset of their poliomyelitis, approximately one in ten had paralysis in the limb of injection. Of the three children who had been injected within the preceding month all had paralysis in the limb of injection.

To allow comparisons to be made we have in Table VIII put our data on the different antigens into the form adopted

TABLE VIII.—*Contrast of Inoculated and Uninoculated Limbs in Children Having an Injection Within 30 Days of Onset of Poliomyelitis**

Agent	Site	Inoculated Limbs		Uninoculated Limbs		Total Limbs
		Paralysed	Not Paralysed	Paralysed	Not Paralysed	
A.P.T. (11 cases)	Legs	1	—	11	10	22
	Arms	7	2	2	11	22
Combined vaccine (24 cases)	Legs	4	1	20	23	48
	Arms	19	—	10	19	48
Pertussis vaccine (4 cases)	Legs	—	1	—	7	8
	Arms	1	2	1	4	8

* This table excludes four children in whom the exact site of inoculation was unknown.

by McCloskey which contrasts inoculated with uninoculated limbs in relation to the frequency of paralysis. In this form we observe again a clear association between the site of paralysis and recent injection with A.P.T. and with the combined vaccine. Our four cases of inoculation with pertussis vaccine give no evidence of association.

Comparison of Poliomyelitis Cases and Their Controls

In Table IX we turn to our control group and contrast the inoculation histories of the children with poliomyelitis with the corresponding histories of their controls. To be sure of this contrast we can take only 164 out of the total 410 poliomyelitis cases, since it was only in these that we had been able to obtain a satisfactorily "paired" control. This "pairing" was made closely for age and sex, while measles cases were accepted only if their date of notification lay *after* the onset of the corresponding case of poliomyelitis. The previous inoculation history was then measured in each such pair from the date of onset in the poliomyelitis case. Eighty-eight of these controls were "measles" controls and 76 were "birthday" controls. This pairing, therefore, seriously reduces the numbers at our disposal, but any less rigorous procedure is in our opinion open to grave objection, since the incidence of inoculation is closely associated with age. Table IX shows

TABLE IX.—*Interval From Last Inoculation to Onset of Poliomyelitis in Cases and in Their Matched Controls*

	Interval from Last Inoculation to Onset of Poliomyelitis Case (Months)						Not Inoculated	Not Known
	0–	1–	3–	6–	12+	All Intervals		
0–23 months of age:								
71 Poliomyelitis cases ..	11	7	7	13	3	41	26	4
71 Controls ..	1	9	7	18	1	36	32	3
24 months of age and over:								
93 Poliomyelitis cases ..	5	1	2	9	38	55	24	14
93 Controls ..	—	1	3	9	34	47	35	11
All ages:								
164 Poliomyelitis cases ..	16	8	9	22	41	96	50	18
164 Controls	1	10	10	27	35	83	67	14

that in each of our age groups rather more of the children with poliomyelitis had had some previous inoculations—41 to 36 and 55 to 47. Division of these figures into the intervals of time that had elapsed between the last injection and the onset of poliomyelitis (in a specified child and its pair) shows a striking result. There is no marked difference in the numbers of distant inoculations, and the excess of inoculations in the poliomyelitis group lies in injections which took place within a month of the onset of the illness.

Time Interval Between Inoculation and Poliomyelitis

Finally, in Table X we set out the intervals of time that had elapsed between the last inoculation and the recorded onset of the illness. In the great majority (26) of the 33 children who had paralysis within 28 days in the limb of injection, the recorded date of onset of symptoms lay in the ten-day interval 8–17 days subsequent to that injection. None fell below eight days, though there were two such cases in which the site of injection was not a site of paralysis. These two cases and others at the upper end of the scale may well have been fortuitous occurrences which must inevitably take place (as Tables IV and V show).

Discussion

Whichever way we choose to set out the statistics collected in this inquiry they reveal clearly an association between recent injections and paralysis. For instance, Tables II and III show that in those inoculated within a month of the onset of their attack of poliomyelitis the distribution of the bodily sites of paralysis is quite

TABLE X.—*Interval From Last Inoculation to Date of Onset of Poliomyelitis in Children who had been Inoculated Within 28 Days of Onset*

Interval from Last Inoculation to Onset of Poliomyelitis (Days)	No. of Children*	
	Under 2 Years	Between 2 and 5 Years
1	(*1*)	
7	(*1*)	
8	4	
9	2	
10	1 (*1*)	1
11	3	1
12	1	(*1*)
13	1	1
14	3	(*1*)
15	3	
16	1	(*1*)
17	4	
18	1 (*1*)	
19	1	1
20	1	
21	1	
22	1 (*1*)	
25	(*1*)	
28	1	
All intervals ..	29 (*6*)	4 (*3*)

* The italicized figures in parentheses are of children who were not paralysed in the limb of injection.

abnormal. There is in these cases a high incidence of paralysis in the arms instead of the normal concentration upon the legs, there is an excess in the left arm compared with the right. We know that inoculations are given predominantly in the arms and mainly in the left arm (and the figures of the present inquiry confirm that general knowledge).

Alternatively we may bring the site of inoculation (whatever it may have been) into a more exact comparison with the site, or sites, of paralysis. We then see (Tables IV and V) that the two sites frequently coincide when the inoculation is of very recent date (that is, within the previous month) and come together significantly less frequently when the inoculation is an event of the more distant past.

Lastly, following McCloskey's analysis, we may consider how often, in the same children, their inoculated limbs are paralysed compared with their uninoculated limbs. We find an excess of paralysis in the former.

We must conclude, therefore, that in the 1949 epidemic of poliomyelitis in this country cases of paralysis were occurring which were associated with inoculation procedures carried out within the month preceding the recorded date of onset of the illness. On the other hand, we find no evidence whatever that any inoculations carried out three months or more before the onset of illness have had any such effect. There is not the slightest indication in our figures that such distant injections have localized the paralysis (Tables II and III) or that they have produced paralysis which would not otherwise have occurred (Table IX). On inoculations within one to three months of the onset of poliomyelitis we have very little evidence what little there is suggests no evil effects—though obviously at the lower end of that period there might be some slight risk. On the other hand, the great majority of the intervals between last inoculation and onset of symptoms that were less than a month lay between 8 and 17 days. Taking a narrower interval, McCloskey reported that 63% of his cases had an interval of 7–14 days. Confining attention to cases with paralysis in the limb of injection, we show a closely similar figure—55%.

With the figures made available by this mode of inquiry we cannot satisfactorily measure the *relative* risks of poliomyelitis following an inoculation, either at different ages or with different antigens. The data do, however, show that the occurrence can (and does) take place in

both the age groups we have used—namely, under 2 years and between 2 and 5 years (Tables IV, V, VI, VII, and IX). The smaller number of positive cases in the higher age group is not necessarily due to any lowering of the risk as age advances, for it must be, in part if not wholly, a function of the frequency with which inoculations are carried out. That frequency is, we know, lower in the higher age group.

Similarly, our figures show that paralysis has certainly followed the injection both of A.P.T. and of the combined A.P.T. and pertussis vaccine; for the pertussis vaccine alone we have no convincing data, and presumably it was not being extensively used (Tables VI, VII, and VIII). As stated, we cannot with figures of this kind determine whether one vaccine is more prone to produce paralysis than another. On the present published evidence we can see little support for the belief that the pertussis and the combined antigens are more prone to do this than A.P.T.

It has naturally been suggested that the effect of a recent inoculation is merely to localize the paralysis in the limb of injection in a child already incubating poliomyelitis. In the absence of inoculation the paralysis would not have occurred necessarily in that limb, but it would have occurred in some limb. The comparison of our cases with their paired controls (Table IX) suggests that this argument may not be well founded. The excess of recently inoculated children in the poliomyelitis group—and the equality in other intervals—does, we think, indicate that the group includes cases which would not have been diagnosed as poliomyelitis at all if there had been no previous and recent inoculation. Such children may already have been cases of non-clinically recognizable poliomyelitis, but the data suggest that they have been brought by inoculation into the paralytic class.

Summary and Conclusions

An investigation has been made to determine speedily whether, in the epidemic of 1949 in England and Wales, cases of paralysis diagnosed as and indistinguishable from poliomyelitis were occurring in association with inoculation procedures.

Records of 410 patients aged under 5 years were collected from 33 administrative areas, and in 164 of these cases a record was obtained for a closely paired control child.

The distribution of the bodily sites of paralysis was quite abnormal in children who had been inoculated within the month preceding the onset of their illness. In this group paralysis in the arms was just as frequent as paralysis in the legs, and the left arm showed paralysis more often than the right; in children without recent injections the two arms were equally affected and the legs were affected two to three times as often as the arms. The distribution in the recently inoculated is in accordance with the customary inoculation procedure in this country—that is, use of the arms more than the legs, and predominantly the left arm.

In the recently inoculated children the limb of injection (arm or leg) was a site of paralysis much more frequently than was the case with children not recently inoculated.

There is no evidence whatever that inoculations carried out in the more distant past have any effect at all upon the incidence or localization of paralysis. These effects appear to be confined to injections given within about a month of the onset of poliomyelitis, and after that interval from inoculation has elapsed no risk need be envisaged.

It has been suggested elsewhere that the recent injection of an antigen merely localizes an already developing paralysis in that particular limb of the child. The contrast of the present poliomyelitis cases with their specially collected and paired control children indicates, however, that there may be present in the poliomyelitis group cases which would not have been clinically diagnosed as poliomyelitis at all if their inoculation had not brought them into the paralytic group.

Paralysis in the limb of recent injection was observed to follow both inoculations with A.P.T. and inoculations with the combined A.P.T. and pertussis antigens. Few figures were available for pertussis vaccine, but one case of paralysis following a recent injection was recorded.

The intervals of time less than 28 days that elapsed between the last injection of an antigen and the recorded onset of symptoms of poliomyelitis lay mainly between 8 and 17 days.

The mode of inquiry was such as to give a rapid and sufficiently accurate answer to the problem at issue—were such cases, in fact, occurring more frequently than could be attributed to chance? From the data thus collected it is not possible to determine the *relative* risks of injections either at different ages or with different antigens. For that purpose another, and a very laborious, statistical investigation is required.

We have very gratefully to acknowledge the care and trouble taken by all the medical officers of health who supplied us with the basic data. We are also indebted to Dr. A. H. Gale, who readily gave us much assistance and advice, and to Sir Wilson Jameson, Chief Medical Officer to the Ministry of Health, who suggested that this was a subject upon which inquiry was obviously desirable and gave us encouragement throughout its course.

REFERENCES

Geffen, D. H. (1950). *Med. Offr*, **83**, 137.
McCloskey, B. P. (1950). *Lancet*, **1**, 659.
Martin, J. K. (1950). *Arch. Dis. Childh.*, **25**, 1.

CLINICAL POLIOMYELITIS IN ASSOCIATION WITH PERIPHERAL INOCULATION OF PROPHYLACTICS

BY

F. O. MacCALLUM, M.D., B.Sc.

(From the Virus Reference Laboratory, Colindale, N.W.9, Public Health Laboratory Service)

Aetiological Investigations

Recent observers in Australia and England have drawn attention to the occurrence, in 1949 in particular, of paralytic poliomyelitis in children who had received prophylactic inoculations within the preceding month. The most striking feature was that the paralysis was either localized to the most recently inoculated limb, or at least was first noticed in that limb, usually the arm. In the article on page 1 Bradford Hill and Knowelden have made a statistical evaluation of data collected in England in 1949 and confirmed the occurrence of such cases in this country.

Without going into the history of paralysis of limbs in association with inoculations of vaccines and sera and with trauma, it may be mentioned that clinical opinion is that two types of syndrome may occur, one of which appears to be associated with a lesion in the anterior horn cells of the spinal cord and the other in peripheral nerves. Therefore it was considered essential to try to determine whether a poliomyelitis virus was associated with the cases occurring in England in 1949, which appeared to be due to a lesion in the anterior horn cells of the cord.

No material has been received from fatal cases in association with the "double event," so that it has not been possible to obtain a histological diagnosis in confirmation of virus studies. However, stools have been obtained less than 21 days after the onset of the illness in a number of children included in some of the recent observations, and the poliomyelitis virus has been isolated by monkey

inoculation from each of the five children whose stools have so far been tested. The rhesus monkeys used all developed a disease similar to experimental poliomyelitis, and lesions pathognomonic of the disease were found in the brain and cord at necropsy.

Case 1.—R. R., aged 10 years. June, 1949. Revaccinated with smallpox lymph with "mild take" 12 days previous to the onset of symptoms. Developed meningo-encephalitis with evidence of paresis of the seventh cranial nerve four days after onset. Stool collected on the sixth day of illness.

Case 2.—S. S., aged 9½ months. September, 1949. Combined diphtheria-pertussis vaccine injected 17 days previous to onset. Paralysis of both arms three days after onset. Stool collected on the fourth day of illness.

Case 3.—D. M., aged 1 year. October, 1949. A.P.T. vaccine injected nine days previous to onset of symptoms. Paralysis, localized to inoculated arm, 12 days after injection. Stool collected on the 14th day of illness.

Case 4.—J. R., aged 1 year. December, 1949. Pertussis vaccine injected four days previous to onset of "cold." Paralysis, confined to inoculated limb, seven days after onset of "cold." Stool collected on the tenth day of illness.

Case 5.—R. W., aged 1 year 7½ months. December, 1949. Pertussis vaccine injected five days previous to onset of symptoms. Could not swallow two days after onset, and paralysis of neck muscles occurred on the following day. Stool collected on the 20th day of illness.

Cases 3 and 4 appear to be examples of the "double event" under discussion. In Cases 1, 2, and 5 the association between inoculation and poliomyelitis-like illness was present, but paralysis was not confined to the inoculated limb.

Summary

Poliomyelitis virus has been isolated from the stools of two children who had paralysis of a limb inoculated 11 and 12 days previously with certain vaccines.

The virus has also been isolated from the stools of three children who developed poliomyelitis or encephalitis 5 to 17 days after receiving a prophylactic inoculation without localization of paralysis in the inoculated limb.

It is recognized that the poliomyelitis virus is widespread during epidemic times, and no suggestion is made here that the viruses isolated were necessarily responsible for the present illness of the patients. These strains will be used, however, for experimental investigation of the problem of the effect of peripheral trauma in precipitating poliomyelitis or localization of paralysis in patients infected with or carrying poliomyelitis viruses.

The National Insurance Advisory Committee has been asked to consider and report on the preliminary draft of regulations which would modify the time limits for giving notice of incapacity and claiming sickness benefit for persons in hospital and for those who have not claimed that benefit before under the National Insurance Act. The proposals in the draft regulations are that a person claiming sickness benefit for the first time would have 21 days to put in his claim and would not be disqualified for having failed to give notice of incapacity. Long-stay patients in hospital would be treated as having good cause for failure to claim sickness benefit within the normal time limits while they are in hospital up to a maximum of three months; for short-stay patients this period would instead be the time spent in hospital and the three weeks after discharge. Copies of the preliminary draft of these regulations (the National Insurance (Claims and Payments) Amendment (No. 2) Regulations, 1950) can be purchased from H.M.S.O. for 3d. or from any bookseller. The committee will consider written objections to them if sent before July 18 to the secretary, National Insurance Advisory Committee, 30, Euston Square, London, N.W.1.

ANTIMALARIAL DRUGS IN WEST AFRICA, WITH PARTICULAR REFERENCE TO PROGUANIL

RESULTS OF A SURVEY IN NIGERIA

BY

LEONARD J. BRUCE-CHWATT, M.D., D.T.M.&H.

AND

JOAN M. BRUCE-CHWATT

(From the Malaria Service, Medical Department, Nigeria)

The traditional bottle of quinine tablets disappeared from the breakfast table of every European resident of West Africa soon after the outbreak of the last war. Mepacrine ("quinacrine," "atebrin"), introduced in 1943 by the armed Forces and adopted of necessity by the non-African civilian population, reigned supreme during the war, to be succeeded soon after the end of it by proguanil ("paludrine").

The use of proguanil for the prevention and treatment of malaria in West Africa dates from 1946, but the general adoption of the new drug was not achieved until well into 1947. The originally advocated dosage of proguanil in West Africa was 0.1 g. twice a week for prophylaxis, and 3 g. in fractional doses over 10 days for a radical cure of infections with *Plasmodium falciparum*, the prevalent parasite species.

In consequence of reports of field trials from other parts of the world the officially advocated prophylactic dosage was soon raised to 0.1 g. three times a week. By the end of 1947 several medical officers in Nigeria expressed their concern about the value of proguanil taken in the above dosage for prevention of malaria. The slow curative action of proguanil caused a good deal of disappointment, especially in severe clinical cases which eventually responded to quinine or mepacrine. The early cautious reports on the value of proguanil in Nigeria were met with a good deal of disbelief.

An important investigation carried out during 1948 by Covell, Nicol, Shute, and Maryon (1949) on neurosyphilitic patients at Horton revealed that infections with the Lagos strain of *P. falciparum* are causally prevented by the prophylactic administration of proguanil in fractional doses varying between 0.3 and 0.7 g. a week. On the other hand, proguanil used alone for treatment of infections with this strain failed to effect a radical cure when given in total doses varying between 2.1 g. in seven days and 4.2 g. in 14 days. Yet Maegraith and Andrews (1949) were able to report constant radical cures with proguanil given in a total dose of 3 g. in 10 days. Their latest results did not materially differ from those obtained in 1945, when the first therapeutic trials of proguanil were being carried out in Liverpool.

Experimental data obtained by Covell and his associates tacitly implied that medical reports referring to the failure of proguanil in the prophylaxis of West African malaria were based on insufficient evidence. None the less, during 1948–9 several medical officers in tropical Africa continued to express their conflicting views on proguanil. While Walls (1948), Bostock (1949), and Abbott (1949) were on the whole satisfied with its prophylactic value, Best (1949), Davey and Smith (1949), Shearer (1949), and Jelliffe (1949) quoted cases of overt *P. falciparum* malaria in subjects taking regularly 0.1 g. of proguanil a day.

In 1949 the Colonial Office and the Medical Research Council, on the advice of the Colonial Medical Research Committee, amended the previous recommendations for the use of proguanil in prophylaxis and treatment of malaria by increasing the prophylactic daily dose to 0.1 g. daily and advising the combined mepacrine–proguanil treatment.

Since the trend of Nigerian medical opinion with regard to the prophylactic and therapeutic value of proguanil and to the frequency and type of side-effects continued to be somewhat at variance with results obtained by recent experimental investigations, it was thought that a collection of a considerable amount of information from medical practitioners and from the non-immune population would be of value.

The non-African population in Nigeria is distributed very unevenly and its composition is extremely varied. Of the total of approximately 11,000 non-Africans in 1948 over 40% were residents of Lagos and of the small area of the Lagos Colony; the remaining 60% were distributed in groups varying between 2 and 500 all over the 373,000 square miles of the Protectorate. The overall racial composition of the non-African civilian population of Nigeria is: Europeans (including Americans), 82%; Syrians and Lebanese, 16%; Indians and others (Egyptians, Arabs, Iraqis), 2%.

The data relevant to the non-African population of the Protectorate could be obtained best through the agency of medical practitioners, more than 300 of whom are distributed over the area and in Government stations, medical missions, and to a very small extent in private practices. The same method of collecting data was not practicable in Lagos with its large mixed non-African community, and it was decided to make a direct approach to this part of the population, but at the same time to obtain some relevant information from the records of the Creek Hospital, which serves the non-African community.

Two suitably designed questionaries were sent—one in August, 1949, to 313 medical officers in Nigeria, and the second in October to 1,400 accessible non-African householders of Lagos. The information thus gathered constitutes the main subject of this paper. The results of the two polls of opinion, medical and non-medical, are analysed and presented separately.

Results of Questionary Sent to Medical Officers

The response to the questionary forwarded to all qualified medical practitioners in Nigeria is shown in Table I.

TABLE I.—*Results of Questionary Sent to Medical Officers*

	No. Sent	Replies Received
Government medical officers ..	196	99 (50·5%)
Mission " "	85	24 (28·2%)
Private practitioners	32	3 (9·5%)
Total	313	126* (40·2%)

* Of 126 replies received 116 came from outside Lagos.

TABLE II.—*Composition of Non-African Population in the Protectorate Relevant to the Medical Questionary*

	Europeans (including Americans)	Syrians, Lebanese, Indians, and Others
Men	2,206	488
Women	1,145	280
Children	593	257
Total ..	3,944	1,025

The composition of the non-African population of the Protectorate of Nigeria, under the medical supervision of 116 medical officers who co-operated in this investigation, is shown in Table II.

The above sample is satisfactorily representative of the overall composition of the non-indigenous population of the Protectorate and constitutes approximately 70% of it.

Incidence of Malaria in Non-Africans

The importance of information on the incidence of malaria in non-immunes residing in a highly endemic area is quite obvious, and yet great difficulty is experienced in attempting to obtain any reliable data in West Africa. The reasons for this are many and not necessarily due to circumstances beyond control. Although reliable statistical records of malarial morbidity in non-Africans are difficult to obtain, approximate evaluation of the incidence of this disease was possible on the basis of data supplied by the medical officers in their replies.

All cases diagnosed as malaria and recorded during the period January 1, 1947, to January 1, 1949, by 116 medical officers from the Protectorate are classified in Table III.

TABLE III.—*Annual Distribution of Cases of Malaria Amongst a Part of the Non-African Population of the Protectorate During 1947–8*

	Europeans				Syrians and Indians			
	Out-patients		In-patients		Out-patients		In-patients	
	Clinical	Pos. Blood	Clinical	Pos. Blood	Clinical	Pos. Blood	Clinical	Pos. Blood
Men ..	618	164	253	87	124	9	64	7
Women ..	309	86	131	27	99	10	28	5
Children ..	75	11	40	13	58	2	7	3
Men ..	782		340		133		71	
Women ..	395		158		109		33	
Children ..	86		53		60		10	
	1,263		551		302		114	
Total ..	1,814				416			

The comparative annual incidence of malaria in men, women, and children of the two racial groups, the ratio of out-patients to in-patients, and the ratio of "clinical malaria" to "blood-positive malaria" are shown in Table IV.

TABLE IV.—*Comparative Annual Incidence of Malaria in Two Main Racial Groups of the Part of the Non-African Population of the Protectorate During 1947–8*

	Europeans				Syrians and Indians			
	Men	Women	Children	Total	Men	Women	Children	Total
Annual incidence of malaria per 1,000	253	241	114	228	210	245	136	222
Ratio of in-patients to out-patients	1:2·3	1:2·5	1:1·6	1:2·3	1:1·9	1:3·3	1:6	1:2·6
Ratio of "blood positive malaria" to "clinical malaria"	1:3·6	1:2·9	1:2·6	1:3·2	1:11·8	1:8·5	1:13	1:10·5
Deaths due to malaria ..	2*				1‡			
Blackwater fever ..	4†							

* Due to cerebral malaria. † 1 fatal. ‡ No details.

Malaria in Takers of Prophylactic Drugs

Information on the type of suppressive drugs taken by the non-African population in the Protectorate is summarized in Table V.

TABLE V.—*Comparative Number of Non-Africans Taking Various Prophylactic Drugs in the Protectorate in 1948–9*

	No. of Takers	%
Proguanil	1,978	69·5
Mepacrine	302	10·6
Quinine	534	18·7
Chloroquine	28	1·0
Total on antimalarial drugs	2,842	100·0
Unknown	1,102	
Grand total	3,944	

The information gathered with regard to the dosage of antimalarial drugs taken regularly by the non-African population is not precise enough to be tabulated. It reveals, however, that most of the proguanil takers during 1947 and 1948 were on the dosage 0.1 g. two to four times a week. By the end of 1948 and at the time of this investigation 87% of adults were following the daily 0.1 g. regimen, 8% were still on the obsolete dosage of 0.1 g. two to four times a week, and 5% were taking either 0.2 g. every day throughout the year, or 0.2 g. daily during the rainy season, or combined the 0.1 g. daily dose of proguanil with 0.1 to 0.3 g. of mepacrine or with 10 to 30 gr. (0.65 to 2 g.) of quinine a week.

Quinine is still taken—in daily doses of 5 gr. (0.32 g.)—by a considerable number of people, particularly by the "old coasters," who are used to it and dislike a change. It is also the favourite suppressive drug given to children. Mepacrine, 0.1 g. three to seven times a week, is still taken by some; these are mostly men who acquired the habit in the Army and do not mind the yellow discoloration of the skin. The most interesting information—namely, the comparative incidence of malaria in large groups of non-Africans taking different antimalarial drugs—was also the most difficult to collect.

Table VI gives relatively small but fairly reliable figures representing the grouped numbers of Europeans on various prophylactic drugs, together with the corresponding number of cases among them diagnosed as malaria during the period 1947–8.

TABLE VI.—*Comparative Numbers of Cases of Malaria in Four Groups of Europeans in the Protectorate Taking Various Suppressive Drugs*

	Antimalarial Drug			
	Quinine	Mepacrine	Proguanil	Chloroquine
Weekly dose ..	35 gr. (2·3g.)	0·4–0·7 g.	0·2–0·7 g.	0·5 g.
No. of takers ..	288	160	956	34
Cases of malaria ..	68 (23·6%)	33 (20·6%)	122* (12·8%)	8 (23·5%)

*Out of 122 cases of malaria in persons on suppressive proguanil 28 were either irregular takers or on 0.1 g. twice a week. If they are excluded the percentage of cases of malaria in takers of proguanil at 0.1 g. four to seven times a week is 9.85.

A few illustrative cases of the apparent failure of proguanil given in the dose of 0.1 g. a day should be quoted. They have been reported and personally observed by experienced medical officers, and some of them occurred in their own families.

Report 68.—"During the past year I have been taking proguanil regularly, 0.1 g. a day, having previously taken mepacrine. In May I ran short of it and took nothing for three days: overt malaria resulted at once. In June, when on 0.1 g. daily, I entered upon a period of hard work and a good deal of mental strain. Again overt M.T. malaria resulted, requiring intramuscular mepacrine."

Report 74.—"Own child, aged 1 month, proceeded to West Africa by sea. Proguanil was started 12 days before landing in West Africa. On board 0.05 g. given every second day and on arrival regularly every day. Three months later acute feverish condition: malaria parasites found by myself; later confirmed in hospital. Treated by quinine intramuscularly; good response; rapid recovery."

Report 107.—"Proguanil taken by me personally, 0.1 g. daily, regularly for a year; two break-throughs with subtertian and quartan parasites in blood."

Opinion with regard to the comparative suppressive value of antimalarial drugs was expressed in 99 replies to the questionary and in 30 replies to a circular letter sent in March, 1949 (Table VII).

TABLE VII.—*Comparative Suppressive Value*

No. of Replies	Best Drug				Equally Good			Not Favoured		
	P	Q	M	C	P=Q	P=M	P=Q=M	P	Q	M
129	60	23	18	1	2	12	8	10	8	6

The most favoured dosage of proguanil is 0.1 g. daily, but six medical practitioners are of the opinion that 0.2 g. daily is better, either permanently or at least during the malaria transmission period, and four advocated taking regular proguanil in conjunction with either mepacrine 0.1 g. two or three times a week or quinine 5 gr. (0.32 g.) a day.

Comparative Therapeutic Value of Antimalarial Drugs

The same poll of medical opinion with regard to the therapeutic value of antimalarials produced 110 replies, which, together with the 30 replies to the circular letter of March, 1949, are classified in Table VIII.

TABLE VIII.—*Comparative Therapeutic Value*

No. of Replies	Best Single Drug				Equally Good		Not Favoured		
	P	Q	M	C	Q=M	P=Q=M	P	Q	M
140	8	67	46	1	16	2	14	2	1

For the immediate treatment of acute malaria with hyperpyrexia, signs of cerebral involvement, distressing vomiting, and massive parasitaemia, quinine holds the first place, and is given intravenously or intramuscularly in doses varying between 5 and 30 gr. (fractional) in the first 24 hours. As an alternative and in less severe forms intramuscular mepacrine is used in doses varying between 0 3 and 0.9 g. during the first 24–48 hours.

Proguanil alone has often proved to be disappointingly slow. The following is a typical comment: "European official, 35 years of age, on regular proguanil, two tablets a week since 1947. Acute fever with intense headache; temperature 101° F. (38.3° C.); blood-slide positive, showing rings of *P. falciparum*. Put on proguanil 0.2 g. three times a day for three days. Little improvement, and on the fourth day the temperature rose to 104° F. (40° C.). Symptoms of cerebral irritation. 10 gr. of quinine hydrochloride diluted in 10 ml. of normal saline given intravenously. Within three hours the temperature dropped to 99.4° F. (37.4° C.), and after six hours was 98° F. (36.7° C.). Next day much improved; kept on oral quinine; made uneventful recovery."

The treatment of attacks of malaria of average severity leaves scope for more varied types of treatment according to the personal views and past experience of every medical officer. The types of treatment favoured by 113 medical practitioners are shown in Table IX.

TABLE IX.—*Type of Treatment Favoured*

No. of Replies	Single Drug				Combined Treatment		
	Q	M	P	C	Q+M	Q+P	M+P
113	18	27	8	1	24	23	13

There is a good deal of variation in the dosage of these drugs, but the average range used in Nigeria is as follows:

Quinine: 30–60 gr. (2–4 g.) daily for 5 to 10 days.

Mepacrine: 0.4–0.9 g. on day 1; 0.3–0.6 g. on days 2 and 3; 0.2–0.3 g. on days 4–6. Total dosage varying between 1.6 and 3 g.

Proguanil: 2–9 g. distributed over 5 to 10 days.

Chloroquine (diphosphate): 1 g. as initial dose, total 2.5 g. in 3 days.

The most popular combined treatments are used in the following dosage range:

Q+M: Quinine is given as a single intramuscular injection of 5 gr. or orally 30 gr. a day for 2–3 days, followed by 0.2 to 0.6 g. of mepacrine daily for 4–6 days.

Q+P: Quinine dosage as above followed by proguanil 0.3 to 0.6 g. daily for 7 to 10 days.

M+P: Mepacrine 0.3 to 0.9 g. on day 1, 0.3 to 0.6 g. on day 2, followed by proguanil 0.3 to 0.6 g. daily for 4 to 10 days.

Toxic Effects of Antimalarial Drugs

Medical reports on side-effects caused by antimalarial drugs were grouped separately for suppressive and therapeutic dosages respectively. In *suppressive* doses quinine seldom causes any degree of cinchonism or other complaints severe enough to be reported to the medical officer.

Mepacrine.—This causes many more side-effects, and the frequency of these symptoms reported by 122 medical officers is as follows: (*a*) slate-blue pigmentation of nails, hard palate, gums, tip of nose, ear lobes, tongue, or prepuce was reported 27 times; (*b*) dermatitis (lichenoid or eczematoid form) or simple pruritus, 19 times; (*c*) anorexia, nausea, vague gastro-intestinal troubles, 12 times; (*d*) mental depression, lassitude, insomnia, nightmares, 7 times; (*e*) hepatitis (?) was reported once. Most reports with regard to side-effects of suppressive mepacrine cover the pre-proguanil period, when practically everybody was on mepacrine, and refer to a civilian population of about 5,000 non-Africans. Calculation of the incidence of these toxic reactions in relation to the exposed population is not practicable.

Proguanil.—Reports on side-effects of prophylactic proguanil refer to the total number of 956 non-Africans and are grouped according to their overall frequency, but not to the weekly dose of the drug. They are as follows: (*a*) anorexia, nausea, mild gastro-intestinal upsets, 13 cases (1.35%); (*b*) headaches, 7 cases (0.72%); (*c*) depression, lassitude, 2 cases (0.21%); (*d*) giant urticaria, 1 case.

Medical observations on toxic reactions due to the *therapeutic* dosage of antimalarial drugs are summarized below:

Quinine.—The well-known symptoms of mild cinchonism are common and need not be reported here. There was one case of quinine amblyopia. Three of the five cases of blackwater fever reported during 1947–8 were associated with high doses of quinine.

Mepacrine.—The symptoms associated with therapeutic doses of mepacrine were: (*a*) of gastro-intestinal origin, 18; (*b*) transient but very disturbing toxic psychoses, usually of hypomanic excitement, more rarely of acute confusional states, 13; (*c*) tachycardia, 2; (*d*) aplastic anaemia, 1; blackwater fever, 1. Eleven cases of acute toxic reactions to the intramuscular administration of mepacrine were reported in infants or small children given normal therapeutic doses, between 0.05 and 0.15 g. The symptoms set off within 10–20 minutes after the injection, and consist of an epileptiform seizure with facial twitching, clonic convulsions, cyanosis, loss of control over the constrictors, and occasional vomiting. Recovery within one to two hours is the rule, but one fatal case was observed.

Proguanil.—Therapeutic doses of proguanil were associated with: (*a*) nausea, vomiting, epigastric pains, diarrhoea, 15 times (particularly in children); (*b*) headaches, 7 times. Haematuria was reported in 5 instances, of which 3 refer to children. The first observation of haematuria was reported by a medical officer who noticed it in his own child (4 years of age) 24 hours after every dose of 0.2–0.3 g. daily. This rather alarming symptom disappeared after the drug was discontinued, but it reappeared on two other occasions when proguanil was readministered. In another child haematuria with hyaline casts was noticed after a daily dose of 0.1 g. for three days. In one adult haematuria was accompanied by intense lumbar and abdominal pain. On the other hand, proguanil can be quite harmless, as demonstrated by the example of a European woman who took 40 tablets (4 g.) in 24 hours without any ill-effects.

Results of Questionary Sent to Non-African Residents of Lagos

A much-simplified questionary was sent to a representative section of the non-African population in Lagos in order to obtain first-hand information with regard to the type of drug and dosage taken, the age and length of residence in West Africa of each person, the incidence of malaria, such toxic effects as had been experienced, and any other relevant information that might be of interest. It should be noted that the non-African population of Lagos is extremely fluid on account of long periods of recuperative leave in Europe, and it is difficult to assess the exact number of non-African residents in Lagos at any particular time. For the purpose of this survey 1,400 households, corresponding to approximately one-third of the total non-African population of Lagos, were addressed. The comparative response is shown in Table X.

TABLE X.—*Results of Questionary sent to Non-African Residents*

	Europeans	Syrians	Indians	Total
No. sent	1,100	200	100	1,400
Replies received	582 (52·8%)	45 (22·5%)	14 (14%)	641 (46%)
No. of persons covered	1,035	57	44	1,136

Length of residence in Nigeria was divided into three groups in order to cover three distinct periods in the history of antimalarial drugs.

Group I: Less than 1 year to 2 years—proguanil period.

Group II: 2 to 7 years—mepacrine period.

Group III: 7 to 40 years—quinine period.

Those classified under Group I came to West Africa when all three drugs were readily available and were therefore able to make a free choice from the very outset. Those in Group II started taking antimalarial drugs at a time when mepacrine was the only available drug. Those in Group III belong to the period when quinine was the only prophylactic in use.

TABLE XI.—*Number of Persons Taking Different Antimalarial Drugs Related to their Length of Residence in Nigeria*

Residence	No. of Takers	Quinine	Mepacrine	Proguanil	Chloroquine	No Drug
—1 year	287	42 (14·6%)	14 (5·2%)	226 (78·7%)	3 (1%)	2 (0·7%)
1–2 years	215	42 (19·5%)	28 (13%)	141 (65·5%)	2 (0·9%)	2 (0·9%)
2–7 ,,	324	84 (24·3%)	37 (11·2%)	200 (62%)	1 (0·32%)	2 (0·6%)
7–15 ,,	153	76 (49·7%)	24 (15·6%)	53 (34·5%)		
15–40 ,,	157	92 (58%)	10 (6·2%)	55 (35%)		
Total	1,136	336 (29·7%)	113 (10%)	675 (59%)	6 (0·5%)	6 (0·5%)

The weekly dose of each drug taken by adults in Lagos is very similar to that taken in the Protectorate generally. In the case of children the dose (varying according to age) is on an average 10 gr. a week for quinine and 0.35 g. a week for proguanil. No children take mepacrine.

Incidence of Malaria in Non-Africans in Lagos

The reported cases of malaria among the non-African population were divided into three groups: (1) Malaria diagnosed as such by a medical officer. (2) Suspected malaria (fever, sweating, rigors, headache, with gastro-intestinal upsets); case not seen or diagnosed by a doctor. (3) So-called "low fever" (persistent slight temperature and general feeling of low health): this group was eventually discarded, as it was felt that its symptoms were too easily confused with those of chill, general ill-health, or undetermined minor ailments.

The relative numbers of cases of diagnosed or suspected malaria reported during the two years in the three groups of drug-takers are shown in Table XII.

TABLE XII.—*Number of Cases of Malaria Reported During 1947–9*

	No.	Diagnosed Malaria	Suspected Malaria	Total
Quinine takers	336	41 (12·2%)	23 (6·8%)	64 (19%)
Mepacrine ,, ...	113	21 (18·6%)	7 (6·2%)	28 (24·8%)
Proguanil ,, ...	675	40 (5·9%)	28 (4·1%)	68 (10%)
Chloroquine ,, ...	6	1 (16·6%)	—	1 (16·6%)
Total	1,130	103 (9·1%)	58 (5·2%)	161 (14·3%)

Cases of malaria, diagnosed or suspected, in persons admitting irregularity or known to have been on less than adequate dosage of any drug have been omitted.

Side-effects of Drugs Taken for Prophylaxis or Suppression of Malaria

The toxic effects which were produced are classified in Table XIII.

TABLE XIII.—*Nature and Number of Toxic Effects Reported*

Quinine	No. of Cases	Mepacrine	No. of Cases
Gastric symptoms	13	Gastric symptoms	61
Deafness, tinnitus	19	Blue pigmentation of nails, nose, etc.	28*
Shakiness, dizziness	9	Dermatitis	18†
Menorrhagia	6	Mental depression	9
Weakness, lassitude	7	General low health	5
Headaches	6		
Depression	6		

* 1 case of onychosis with loss of toenails. † 1 case of erythroderma.

Proguanil	No. of Cases	Per cent of all Proguanil Takers, Former and Present (750)
Gastric symptoms	35	4·67
Headaches	13	1·73
Depression	11	1·47
Lassitude	7	0·93
Dizziness	4	0·54
Dermatitis	2	0·27
No. of persons reporting toxic effects	58	7·75

Changes from one drug to another are not significant in the case of quinine or mepacrine, as both were taken of necessity at different times and subsequent changes or reversions to one or the other do not necessarily imply dissatisfaction. With proguanil, however, the choice of drugs was voluntary, and changes are noted here: 75 persons (6.3% of the total) took proguanil and changed either to quinine or mepacrine; 25 of these reported attacks of malaria (without stating the dosage they were taking), 25 had complaints shown in Table XIII, and 25 gave no definite reasons. It should be pointed out that the six persons who voluntarily take from 14 to 42 (!) tablets of proguanil every week have not reported any toxic effects of the drug.

Survey of the Incidence of Malaria at the Creek Hospital, Lagos

It was felt that the results of the inquiry obtained direct from a representative sample of the non-African population of Lagos should be supplemented and correlated with the statistical data recorded at the Lagos Creek Hospital.

Table XIV brings out some salient points with regard to the importance of malaria in non-African residents of Lagos and the Colony during the period 1946–9.

The overall mean incidence of malaria calculated on the basis of replies obtained direct from the population concerned is 47.7 per 1,000 per year during 1947–9 (Table XII). The respective figure obtained from the records of the Creek Hospital (Table XIV) is 41.3 per 1,000 per year. The difference between the two figures is relatively small, and is due to the inclusion of cases of "suspected malaria" not admitted to the hospital.

As a rule malaria in Lagos is a comparatively mild disease, easily yielding to adequate treatment. The average duration of the stay at the Creek Hospital is 5.2 days, and, generally speaking, less than 10% of patients can be regarded as seriously ill. However, every year there occur sporadic cases of fulminant infections, with enormous numbers of parasites in the blood, very early cerebral symptoms, and death within 8 to 24 hours after admission. It must be emphasized that all four fatal cases of cerebral malaria in adults during 1948–9 occurred in people who

TABLE XV.—*Distribution of Antimalarial-drug Takers in 55 Cases of Malaria During 1949*

	Antimalarial-drug Takers on Regular Daily Regimen			No Drug, or Very Erratic Takers
	Proguanil	Mepacrine	Quinine	
No. of cases of malaria	16 (3)	7 (2)	9 (2)	23 (14)
Average duration of stay in the hospital ..	3·7 days	5·1 days	5·5 days	4·7 days (fatal cases not included)
Total No. of cases ..	32			23
Deaths due to malaria ..	0			3

NOTE.—Figures in parentheses refer to the number of cases in which malaria parasites were found in the blood film taken on admission.

TABLE XIV.—*Incidence of Malaria in Non-African Residents of Lagos During 1946–9 (Creek Hospital)*

Year	Non-African Resident Population	Overall Morbidity of the Non-African Resident Population			Overall Morbidity per 1,000	Malaria Incidence in Non-African Residents. No. of Admissions				Deaths Due to Malaria	Overall Incidence of Malaria per 1,000	Malaria Incidence per cent Overall Morbidity	Ratio Blood-Positive Malaria to Clinical Malaria
		Men	Women	Total		Men	Women	Children	Total				
1946	1,842	509	247	756	410	67	23	1	91	1 ad. 1 child	49·0	12·0	1 : 2·1
1947	2,990	701	287	988	330	123	37	5	165	1 ,, 1 ,,	55·5	16·7	1 : 3·8
1948	4,305	661	340	1,001	234	109	26	8	143	1 adult	33·3	14·3	1 : 2·1
1949	4,900	667	354	1,021	208	139	44	12	195	3 ad. 3 inf.	39·8	19·2	1 : 2·1

were not taking any prophylactic drugs. The three fatal cases in newborn European infants were diagnosed as congenital malaria. Blackwater fever has practically disappeared since 1945 except for one fatal case that occurred in 1949 in an irregular quinine-taker.

Detailed past history of the prophylactic regimen was obtained from records of 55 cases of malaria in non-African residents of Lagos admitted to the Creek Hospital in 1949 (Table XV).

Discussion

The information with regard to the present trends of medical and lay opinion pertaining to the prophylactic and therapeutic use of antimalarial drugs in Nigeria, obtained by means of two questionaries, revealed several important points.

The prophylactic efficacy of antimalarial drugs could not be assessed with any degree of certainty on account of the lack of reliable statistical data on malaria in West Africa. This regrettable situation has changed very little since Granville Edge (1937) drew attention to it, and even the figures for malaria incidence among the few thousand non-Africans in Nigeria are sketchy. This is due to several reasons.

The greater part of the European population in West Africa has an estimated turnover of about 30% during the year, and relatively few return to the same station after an 18-months tour. The medical facilities in different stations vary considerably, and while in a station with adequate hospital accommodation most of the non-African cases of malaria are recorded as in-patients, in other stations all these cases remain at home and are recorded as out-patients or remain unrecorded. Records themselves are often casual and lack continuity on account of frequent changes of station medical officers.

Another important reason for unsatisfastory statistics of malaria in West Africa is the fact that the diagnosis of this disease leaves a wide margin for personal interpretation of clinical symptoms and of results of the blood examination for parasites. Wartime experience has shown that in not a few stations in Nigeria the average technique for laboratory diagnosis of malaria is inadequate.

The attitude of the individual medical officer towards the problem of diagnosis of malaria varies considerably between two extremes. One, remembering the protean clinical picture of *P. falciparum* infections, diagnoses any case of headache, fever, gastro-intestinal upset, etc., as malaria, and records it as such. The other clinches the diagnosis of malaria only when it is confirmed by finding parasites in the thick or thin blood film (though this confirmation may come from a junior technician whose reports are seldom checked). That many clinical errors are bound to be committed in the first case is obvious. None the less it seems that the opposite attitude has something of a counsel of perfection and can also lead to mistakes. Some striking differences between two successive annual rates of malaria in the same locality could be traced to a change of medical officers, with dissimilar ideas on the problem of diagnosis of this disease.

There is little doubt that there exist in West Africa cases of subtertian malaria with severe clinical symptoms preceding by a day or two the appearance of scanty parasites in the peripheral blood. Hughes and Bomford (1944) found that in 968 hospital cases of West African malaria of five clinical types (febrile, gastro-intestinal, respiratory, myalgic, cerebral) parasites were found in the blood at the first examination in 57%, while in 13% parasites were not found during the first few days and the condition had to be treated as clinical malaria. The occasionally late appearance of parasites in severe attacks of malaria in West Africa was more recently confirmed by Nelson-Jones (1944).

The supreme importance of the laboratory in the diagnosis of *P. falciparum* malaria and as a guide to its treatment is emphasized by Field (1949); a high standard should be aimed at but will be difficult to attain in tropical Africa.

It seems that the laboratory diagnosis of malaria in West Africa is handicapped by two facts, diametrically opposite in non-immune Europeans and in immune Africans. In non-immunes the habit of taking antimalarial drugs reduces to a considerable degree the chance of finding parasites in the blood (Table XV) and leaves the alternative—an anathema to a good clinician—of diagnosing malaria by the good result of a tentative specific treatment, which cannot be withheld for long. On the other hand, the symptomless presence of parasites in immune Africans is a common finding in children and (to a less degree) in adults, and does not necessarily indicate an overt clinically important infection, but may accompany any intercurrent disease.

In considering the epidemiology of malaria in non-immunes one more point must not be forgotten. Although *P. falciparum* is the main parasite in West Africa, *P. malariae*, *P. vivax*, and *P. ovale* are also present. The possibility of Europeans having a relapsing benign tertian or quartan malaria of West African origin is seldom considered, in spite of the fact that relapses of vivax malaria were seen in the U.K. in people who during the war spent a year or so in West Africa and nowhere else.

In Nigeria the mean overall ratio of records of "clinical malaria" to "blood-positive malaria" is 2.5 to 1 in Europeans. The embarrassingly large number of cases of so-called "clinical malaria" and the difficulty that these cases present for an evaluation of a suppressive or curative regimen is not new. During the war the same problem had to be faced by the Army Medical Services when collecting the annual statistical data for the West Africa Force. There, in spite of a far more standardized hospital treatment, better laboratory facilities, more adequate supervision, and less-variegated and more-disciplined patients, the mean ratio of "clinical malaria" to "blood-positive malaria" was 1:1.2 (in 1944).

Thus in the present state of affairs in West Africa there are no criteria on the basis of which true statistical data of malarial morbidity can be separated from cases erroneously diagnosed as malaria. In the circumstances all cases labelled as malaria by the medical officers were taken into consideration for assessment of the comparative value of antimalarial drugs in Nigeria.

The pooled results of the two country-wide questionaries, covering about 48% of the non-African population of Nigeria, revealed that proguanil is at the present time by far the most popular prophylactic drug, being used by 65% of all the non-Africans. The respective figures for quinine, mepacrine, and chloroquine are 22.5, 10.3, and 0.9%. The prevailing medical opinion in Nigeria is that proguanil is the best and least toxic antimalarial. This opinion was expressed by 60% of the medical officers. Percentages of opinions favouring quinine and mepacrine were 23 and 18 respectively.

On the assumption that every case reported as malaria was correctly diagnosed, the following figures of the incidence of malaria were obtained for four groups of non-Africans taking prophylactic antimalarial drugs in

1948–9. In the Protectorate, according to medical records, malaria occurred in 9.9% of those on regular proguanil regimen; 23.6% of quinine-takers; 20.6% of mepacrine-takers; and 23.5% of chloroquine-takers. The figures for Lagos and the Colony area, obtained direct from the population concerned, are 10% in proguanil-takers, 19% in quinine-takers, 24.7% in mepacrine-takers, and 16.6% in chloroquine-takers.

There can be little doubt that, in Nigeria, proguanil taken in a daily dose of 0.1 g. is far superior to mepacrine and quinine as a prophylactic. The difference between the malaria rates of the combined suppressive quinine–mepacrine group of non-Africans and the parallel group on prophylactic proguanil is 7.6 times the standard error of the difference and therefore highly significant.

In spite of the fact that 1 g. of proguanil daily is more efficacious than any other drug (including chloroquine) the percentage of cases of malaria in proguanil-takers amounts, according to both questionaries, to about 10%. Some of these cases may be erroneously diagnosed or be due to carelessness in taking proguanil, or to both. None the less, even after discounting these errors, several break-throughs seen in regular proguanil-takers at 0.1 g. daily were reported by conscientious and experienced medical officers and have too authentic a ring to be lightly dismissed.

The causes of these relatively rare break-throughs of West African malaria in subjects who have apparently been taking regular and adequate doses of proguanil are not quite clear. They may be due to individual differences in the absorption of the drug, to its too rapid excretion, or to the transformation of the active principle into a non-active compound. The hypothesis of the chemical change or faster excretion of proguanil in some subjects has not been confirmed by Field and Edeson (1949), who demonstrated that the proguanil resistance of the Malayan strain of *P. falciparum* was inherent to it and not related to the fate of proguanil in the organism of the patient.

There remains the probability that occasional failures of proguanil prophylaxis in West Africa are caused by a particularly resistant strain of *P. falciparum*. The resistance to adequate therapeutic doses of proguanil was well demonstrated by Covell and his team, but the value of this drug in the prophylaxis of infections with the Lagos strain was confirmed.

It must be borne in mind that the Lagos strain of *P. falciparum* established at Horton is only one of the unknown number of strains which are bound to exist in a hyperendemic zone with its unlimited possibilities for crossings and mutations. Other strains may behave differently in experimental infections and show a greater resistance to prophylactic proguanil. One sees no reason why this should be disturbing or surprising. The same facts were tacitly admitted or somewhat less discussed with regard to suppressive mepacrine in West Africa during the war. While the enforced and regularly supervised daily administration of mepacrine in the South-East Asia Command reduced the incidence of malaria within a few months to a practically negligible level, the same dose of mepacrine in the West Africa Force could not bring the number of malarial attacks in European personnel below 378.8 per 1,000 in 1943 or below 278 per 1,000 in 1944 (Findlay and Stevenson, 1944; Stevenson, 1945). One had to conclude with some reluctance that a daily dose of 0.1 g. of mepacrine is not a perfect suppressive for all strains in West Africa and that the facile explanation of carelessness in taking the drug could not be applied to all cases (Findlay and Stevenson, 1944). A similar occurrence was reported by Fairley and his associates (1946) in New Guinea, where the Aitape-Wewak strain was found to be relatively resistant to mepacrine.

It is worth mentioning here that two European residents of Lagos who were in the Far East during the war and had no malaria while on suppressive mepacrine developed malaria in West Africa in spite of having remained on the same mepacrine regimen.

The other and most probable explanation of reported failures of prophylactic proguanil in West Africa may be due to the fact that in localities with a high infective density of anopheles a delay of one week before starting the prophylactic routine, or an interval of more than five though less than eight days in the otherwise regular regimen, may be sufficient to miss the essential causal action of proguanil on pre-erythrocytic forms of the parasite. Subsequent resumption of the regular prophylactic regimen will not prevent the first wave of erythrocytic merozoites from establishing the infection. With the proguanil unable to effect a radical cure of West African subtertian malaria, as shown by Covell and his associates, the "prophylactic" routine would then be not more than an imperfect cure with spontaneous recrudescences of the primary infection or occasional break-throughs during any intercurrent disease. The rapid rate of excretion of proguanil makes this explanation plausible.

Naturally, the theoretical blame for the failure to keep up an ideal prophylactic regimen would in this case lie with the human subject, but it seems that just as much responsibility remains with the drug, which because of its rapid rate of excretion has not sufficient "carry-over" value.

With regard to the therapeutic value of proguanil, the consensus of medical opinion in Nigeria emphasizes its slow action and its failure to bring about a radical cure of infections with *P. falciparum*. This fully corroborates the experimental results obtained by Covell and his team. The wide and early adoption of the combined treatment of acute malaria by medical officers in Nigeria seems to have anticipated the recent official recommendations of the Colonial Medical Research Committee (1949).

Field and Edeson (1949) suggested that the Lagos strain obtained by Shute in 1947 has become resistant to the curative action of proguanil on account of some possible previous contacts with this drug, similarly to the proguanil resistance produced experimentally by Adams and Seaton (1949) or acquired naturally by the Negri-Sembilan strain. The suggestion is a plausible one, but its correctness is highly unlikely. The Lagos strain was isolated in November, 1947, from a child living in one of the suburbs of Lagos. In 1947 proguanil was mainly restricted to hospital use, and no attempts at mass prophylaxis of malaria in the African population by this drug were ever carried out in Lagos.

So far as side-effects of prophylactic regimen are concerned, the very low toxicity of proguanil was confirmed by the two pools of opinion. None the less, it was found that even a drug of very low toxicity can produce a certain amount of mild side-effects in Europeans, of both sexes, who are compelled to take it for years in physically and mentally trying climatic conditions.

In the therapeutic dosage proguanil seems to be remarkably well tolerated by an overwhelming majority of patients. Minor toxic symptoms include vomiting and epigastric pain, particularly with maximum daily doses taken on an empty stomach. Haematuria, an alarming though transient symptom, was recorded in five instances—four times in children.

Analysis of the present trend of medical and lay opinion in Nigeria suggests that lately there has been some increase in the popularity of quinine for suppression of malaria.

It is a matter for regret that the initial dosage of proguanil advocated at the time of its introduction in West Africa was so overcautiously low in spite of the unusually wide margin between its active and its toxic dosage. Subsequent changes of official recommendations have somewhat undermined the confidence of the non-African population. Occasional cases of malaria in persons taking supposedly adequate prophylactic dosage of proguanil and reports of its slow curative effect have produced a psychological reaction of "sales resistance" to proguanil and a tendency to return to the "good old quinine," particularly among the "old coasters."

This tendency is to be deplored and warned against because proguanil still remains the best and least toxic antimalarial drug. Quinine is not only an unsatisfactory suppressant of malaria but has also many melancholy associations with blackwater fever—an entity which had become so rare as to be almost forgotten. There is little doubt that, therapeutically, quinine is almost unanimously preferred on account of its rapidity of action and lack of any serious toxic effects.

With regard to chloroquine, although the present survey yielded a very limited amount of information it seems to have produced the first available data on the prophylactic use of this drug in West Africa. Until recently chloroquine diphosphate ("aralen") was available only to a few Americans residing in Nigeria, who were taking two tablets (0.5 g.) a week, corresponding to 0.3 g. of chloroquine base. According to the pooled information received direct from the persons concerned and from two experienced American medical missionaries, chloroquine taken regularly in the above dosage failed to prevent an infection with *P. falciparum* in 23.5% of cases—an incidence of malaria similar to that obtained in the quinine-taking group of non-Africans.

On the other hand, the few available medical reports on the therapeutic value of chloroquine in West Africa and the results of a field trial in progress seem to indicate that chloroquine is probably the most potent and rapid synthetic schizonticide known, achieving with a high degree of constancy what appears to be a radical cure of falciparum infections of West African origin and showing very few side-effects.

Sapero's (1947) remarks with regard to therapeutic postulates of antimalarial drugs can also be applied in West Africa to the evaluation of their prophylactic action: "Action of antimalarial drugs depends on the chemotherapeutic value, the efficacy of the immune mechanism, and the inherent characteristics of the causative species or strain. The ideal drug capable of effecting a causal prophylaxis and a radical cure of all infections with *P. falciparum* remains to be discovered. At the present time we have an adequate arsenal of antimalarial drugs of suboptimal efficacy, and one has to devise ways and means to attain the best possible effects from a combination of drugs not wholly effective."

Summary

A survey of the incidence of malaria in the non-African population of the Colony and Protectorate of Nigeria was carried out by means of two questionaries sent to the medical officers throughout the country and to a representative sample of the non-indigenous residents of Lagos.

In spite of the difficulty in obtaining any reliable data with regard to the malaria morbidity in non-Africans, the survey revealed that during 1947 and 1948 the annual malaria morbidity of non-Africans was approximately 225 per 1,000 in the Protectorate and 44.5 per 1,000 in Lagos.

The pooled results of the two questionaries have shown that prophylactic proguanil is used by 65% of the non-African population. The respective figures for quinine, mepacrine, and chloroquine are 22.5, 10.3, and 0.9%.

The comparative pooled figures of malaria incidence in four groups of non-Africans taking various antimalarial drugs or chloroquine are as follows: 10% in proguanil-takers, 21.8% in quinine-takers, 22.6% in mepacrine-takers, and 22.5% in chloroquine-takers.

The slow therapeutic effect of proguanil and its failure to produce a radical cure of *P. falciparum* malaria are confirmed.

With the exception of a small percentage of cases in which mild or transient side-effects of prophylactic and therapeutic proguanil were experienced, this drug has a very low toxicity.

The occasional failures of prophylactic proguanil are reported and their possible causes discussed.

Our thanks are due to Dr. G. B. Walker, Director of Medical Services, Nigeria, for his permission to publish this paper. We are extremely grateful to the medical officers in Nigeria whose contribution formed the basis of this investigation. We are much indebted to Dr. Ian Gregor Macgregor, senior specialist, Creek Hospital, for his valuable co-operation, and to Professor E. G. Maegraith for his assistance.

BIBLIOGRAPHY

Abbott, P. H. (1949). *British Medical Journal*, **1**, 413.
Adams, A. R. D., and Seaton, D. R. (1949). *Trans. R. Soc. trop. Med. Hyg.*, **42**, 314.
Best, A. M. (1949). *British Medical Journal*, **1**, 324.
Bostock, M. (1949). Ibid., **1**, 193.
British Medical Journal (1949). **1**, 106.
Colonial Medical Research Committee (1949). Ibid., **1**, 585.
Covell, G. (1949a). Ibid., **1**, 192.
—— (1949b). Ibid., **2**, 773.
—— Nicol, W. D., Shute, P. G., and Maryon, M. (1949). *Trans. R. Soc. trop. Med. Hyg.*, **42**, 341, 465.
Davey, F., and Smith, M. (1949). *British Medical Journal*, **1**, 956.
Edge, P. Granville (1937). *Trop. Dis. Bull.*, **34**, Suppl. p. 3.
Fairley, N. H. (1949). *British Medical Journal*, **2**, 825, 891.
—— *et al.* (1946). *Trans. R. Soc. trop. Med. Hyg.*, **40**, 105, 229, 621.
Field, J. W. (1949). Ibid., **43**, 33.
—— and Edeson, J. F. B. (1949). Ibid., **43**, 233.
Findlay, G. M. (1947). *Trop. Dis. Bull.*, **44**, 763.
—— and Stevenson, A. C. (1944). *Ann. trop. Med. Parasit.*, **38**, 168.
Hughes, S. B., and Bomford, R. R. (1944). *British Medical Journal*, **1**, 69.
Jelliffe, D. B. (1949). *Lancet*, **1**, 1052.
Maegraith, B. G., and Andrews, W. H. H. (1949). *British Medical Journal*, **1**, 545.
Nelson-Jones, A. (1944). *Ann. trop. Med. Parasit.*, **38**, 1.
Sapero, J. James (1947). *Amer. J. trop. Med.*, **27**, 271.
Shearer, Gavin (1949). *British Medical Journal*, **1**, 775.
Stevenson, A. G. (1945). Annual Medical and Sanitary Report West Africa Force, 1944.
Van Riel, J. (1948). *Ann. Soc. belge Méd. trop.*, **28**, 85.
Walls, E. S. (1948). *British Medical Journal*, **2**, 225.
West Africa Command (1947). Paludrine Suppressive and Therapeutic Trials, 1947. (Mimeographed Report.)

The Health Council of Greater New York has just celebrated its third anniversary. According to the *New York Times*, the council is "not just another agency that works with medical societies and health officers. It is more interested in positive health than in disease." Its activities are widespread. It has given help to local authorities to establish mental hygiene clinics; it has cleaned up vacant building lots and converted them into recreation grounds; it has operated a milk co-operative, reduced the smoke nuisance from large factories, participated in water conservation programmes, successfully insisted on better garbage collection, organized cooking classes, and seen that school-children have had midday meals. All this work is voluntary. The council teaches that citizens do not need to be forced by the Health Department into taking care of themselves, their neighbours, and their surroundings if they are taught by the Health Council to do so spontaneously.

THE DUMPING SYNDROME

AN OPERATION FOR ITS PREVENTION

BY

THOMAS O'NEILL, M.D., M.Ch., F.R.C.S.

Assistant Surgeon, Sir Patrick Dun's Hospital, Dublin

The term "dumping" is applied to a syndrome that occurs in a quite high percentage of cases following gastrectomy or, less frequently, gastro-enterostomy. The symptoms occur during or on completion of a meal, and are characterized by a feeling of weakness and occasionally nausea; an unpleasant feeling of warmth all over the body; cold sweat on the face; and rapid action of the heart and often a rise in blood pressure. They last for about half an hour, and vary in severity up to the point of producing complete prostration. The condition has been the subject of intensive investigation for some years, and search for the cause has involved the exploration of such diverse possibilities as distension of the gastric stump, gastritis, hypochlorhydria and achlorhydria; toxaemia from the absorption of incompletely broken-down products, shock, and neurosis; hyperglycaemia; and jejunal distension and jejunitis.

Jejunal distension and abnormalities of carbohydrate metabolism seemed to be the most significant factors and consequently received the attention of many investigators. In their study of patients suffering from dumping ("early postprandial symptoms") Schechter and Necheles (1949) concluded that "there is probably no aetiological relationship between the early postprandial symptoms and the abnormal glucose-tolerance curves, which both occur in some patients with gastrectomy or gastro-enterostomy," and that there is no fundamental disturbance in carbohydrate metabolism in patients who manifest early postprandial symptoms or abnormal carbohydrate tolerances." In the same year the role of carbohydrate was further elucidated by the work of Machella (1949), whose conclusions agreed with the above; Machella, however, took the investigation further and found that the syndrome could be produced in a variety of healthy subjects and dumpers both by the ingestion of hypertonic solutions other than glucose and by the mechanical distension of the efferent jejunum. He noted that the presence of hypertonic solutions in the jejunum produced marked secretion from the gut, and he concluded that the dumping syndrome is caused by "distension of the jejunum . . . due to an outpouring of fluid by the jejunal wall in an attempt to dilute hypertonic food material that has been passed along by the non-retentive stomach rather than to the mechanical passage of the food *per se*. The symptoms are not caused by hypoglycaemia or hyperglycaemia, though hyperglycaemia may be present during the period of symptoms if the particular hypertonic solution responsible for their production happens to be a sugar solution such as sucrose or glucose."

It is possible that this ingenious explanation holds true in at least some of the cases; there is no doubt that the gastric remnant is non-retentive in all cases, though the degree to which it exercises this tendency varies with the type of resection performed. Custer *et al.* (1946) believed that the rapid emptying was the chief cause of the syndrome and that "the results of operation that narrow the opening of the gastric remnant have been uniformly good." They favoured the Schoemaker and Hoffmeister resection technique and thought that dumping that resulted from operation other than the Polya was likely to be temporary and mild, a conclusion not supported by the present series. After investigation of 130 Polya gastrectomies and an extensive survey of the literature, Watson (1947) also favoured the narrow stoma: he found over 50% of dumpers in his series. Even this high figure is exceeded by Muir (1949), who, from 124 similar resections, reported 75% of dumpers. Visick (1948) noted 16% in a sequence of 500 cases. Figures from American sources average about 15%.

I investigated a personal series of 162 gastrectomies performed between April, 1945, and March, 1949; a questionary concerning all was filled in, most were personally interviewed, and 100% were traced. Six (3.7%) died as a direct result of operation, from the following causes: pulmonary embolus (necropsy), 2; ? acute mania (limited necropsy), 1; cachexia due to Addison's disease and gastric cancer, 1; infective jaundice in a patient with prostatism, 1; suffocation from vomit half an hour after return to bed, 1. There were eight late deaths: recurrence following resection for cancer, 3; cardiac failure, 2; stroke, 1; motor accident, 1; further operation for gastro-jejuno-colic fistula, 1.

Dumping occurred in 31 (20.9%) of the 148 survivors, and was present in severe form in 10; 3 mild cases made complete recovery, 3 described under the heading "severe" have periods when their symptoms are mild in character, and others have had remissions regardless of the type of operation performed. Most related their symptoms to bulky carbohydrate meals, some to the first meal of the day, and a few to tea or coffee. In one case the symptoms occurred only if the patient ate plaice or sole—two delicacies to which he had long been addicted. One patient thought that his present condition was no better than it was before operation, and all considered that they suffered a definite disability.

Though it would seem from reports on gastrectomy for peptic ulcer that authors do not always include even severe dumping in their list of failures, the condition is a serious challenge to the surgeon advising a procedure likely to produce it and is no less a challenge from the fact that the patient may think the new disability mild by comparison with the old. The man who suffered severe ulcer pain does not worry unduly about functional symptoms, and for that reason a brief note on the indications for operation may be of interest. In the 162 cases the diagnosis was: gastrojejunal ulcer, 10 (with pyloric stenosis, 1); duodenal ulcer, 91 (with pyloric stenosis, 20); gastric ulcer, 48 (with pyloric stenosis, 1); gastric carcinoma, 13.

Nearly all of the uncomplicated ulcers penetrated the adjacent viscera; five of the sleeve resections were performed as the only radical alternative to total gastrectomy for high and extensive gastric ulceration; the sixth was used in dealing with a giant mid-gastric ulcer in a woman of 78. All the uncomplicated ulcer cases had been referred by physicians, and a number of patients who were operated on did not proceed to resection, as the findings were not held to justify so radical a procedure. No patient was denied operation because of a statistical possibility of his death; the ages ranged between 16 and 82. The 148 survivors consisted of 115 males and 33 females; 23 males and 8 females complained of dumping.

The Table indicates the significance of the particular type of operation performed in relation to the development of the syndrome. The important points appeared to be that the Polya resection produced the highest percentage of cases, that the Schoemaker technique prevented the occurrence of dumping in severe form, and that the Hoffmeister–

Finsterer method failed to do so. In all except one of this series the symptoms began within a month of operation, and in most cases the patient first became aware of them when he began to take his meals at table, after his period of post-operative recumbency. In this paper the term "severe" is used to describe those cases in which the urgency of the symptoms produced *a compelling necessity to recline*.

Dumping Syndrome in 148 Survivors

Operation	No. of Cases	Dumping Syndrome
Hoffmeister–Finsterer ..	117	24 cases, severe symptoms in 5
Polya	3	3 cases, severe symptoms in 1
Sleeve resection	6	None
Billroth I type	22	4 cases, severe symptoms in none

The rapid emptying that follows resection with gastro-jejunal link-up was confirmed by *x*-raying a series of cases, and though the actual rate varied from case to case it appeared that many who were symptom-free emptied just as quickly as those who were severe dumpers. In others, both with and without symptoms, there seemed to be a certain amount of seesaw movement between the jejunum and the gastric remnant, as shown by the latter containing more barium after about half an hour than it did at the beginning of the meal. This phenomenon probably represents a minimal reaction of the jejunum to overloading, and is of interest in that it may occur in patients with no symptoms. Attacks of diarrhoea or vomiting occurring in gastrectomized patients are undoubtedly of similar origin and differ only in exhibiting a more severe response. The discharge into the jejunum takes place just as rapidly after the Hoffmeister–Finsterer as after the Polya operation, the barium appearing to go straight through from the oesophagus to the gut in both cases. The smaller percentage of dumpers that result from the former operation must therefore be due to some other effect produced by the valve. In the words of Visick, the valve cannot affect the emptying time unless "the stomach is narrowed to the point of producing actual organic obstruction," but it can, and in my view it does, affect the character of the emptying. After the Polya operation the passage of food from the oesophagus to the jejunum is unimpeded; after the Hoffmeister–Finsterer operation some of the food is deflected towards the greater curvature, with the result that it reaches the jejunum in a less precipitate manner (Fig. 1, B). It is as if in one case a bather entered a swimming-pool by diving from the board, in another by sliding down the shute.

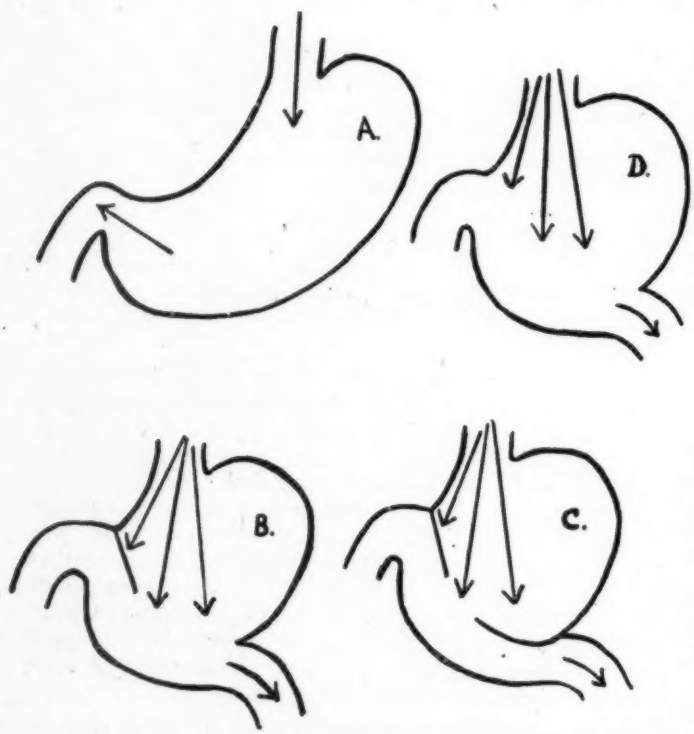


FIG. 1.—A. Course of food in normal stomach. B. Action of Hoffmeister–Finsterer in deflecting food from jejunum. C. Showing effect of double valve in preventing the precipitate discharge of food into the jejunum. D. Diagram of course of food after Polya gastrectomy.

A number of mechanisms, including the position and calibre of the pylorus, the concavity of the duodenum, and the duodeno-jejunal flexure, retard the passage of food from the stomach to the jejunum (Fig. 1, A). It is unlikely, therefore, that any resection involving gastro-jejunal anastomosis would be free of the risk of producing the dumping syndrome if the rate and character of the gastric emptying were such important factors in its causation, but the anastomosis described below should be effective in limiting its frequency and severity.

In the method to be described the stoma occupies the middle of the cut end of the stomach, the remainder being closed by an upper and a lower valve. The upper one, as in the Hoffmeister technique, tends to limit the flow of bile into the gastric remnant and to prevent the retrograde passage of food into the duodenum. The important valve is the lower one, and its function is to prevent food from passing from the oesophagus to the jejunum without a preliminary period of retention in the stomach (Fig. 1, C). Finally, the efferent loop is sutured for a distance of ½ in. (1.25 cm.) along the greater curvature in order to produce a further effect in "easing" the food into the jejunum.

Operation

The patient comes to the theatre with a Ryle tube *in situ*; if resection is decided upon the stomach is aspirated and the tube removed. In the case of duodenal or recurrent ulcer it is considered that at least five-sixths of the stomach is removed.

Two Payr's clamps are placed across the stomach along the line chosen for anastomosis. The distal stomach is removed flush with the upper clamp but a fringe is left on the lower one.

The upper clamp is removed and the cut end of the stomach is closed with two layers of 00 chromic catgut, the end of the final layer being retained as a stay suture. The mesocolon is slit along a line extending outwards from a point about 1½ in. (3.75 cm.) from its root. The corner corresponding with the root of the mesentery is sutured to the posterior wall of the stomach at a point opposite the tip of the Payr's clamp. Thus the mesocolon can be sutured around the gastric remnant without causing a drag on either structure. Only the posterior layer of sutures are inserted, the end ones being retained for traction; the previous stay suture is removed.

The jejunum is drawn through the mesocolic rent and sutured along the full length of the posterior cut edge of the stomach. When the line is completed the end is knotted and the single upper end and double lower end are used for traction, the previous stay suture being removed. The fringe left on the Payr's clamp is excised and the clamp removed; the edges are well sealed at this stage and do not gape. The lower half of the stoma is buried in two layers and Duval's tissue forceps are placed on the upper half.

The operation field is packed off with sponges and an opening corresponding in size to the central gastric stoma is made in the jejunum; when making the incision in the latter structure it is important for subsequent ease of suturing that the jejunal edges deviate slightly from the gastric ones at the corners. The anastomosis is made as in Fig. 2, care being taken that the sutures on the gastric side lie proximal to the crushed edge. The original gastro-jejunal suture is continued along the anterior edge of the stomach and jejunum, and the operation is concluded with closure of the hole in the mesocolon.

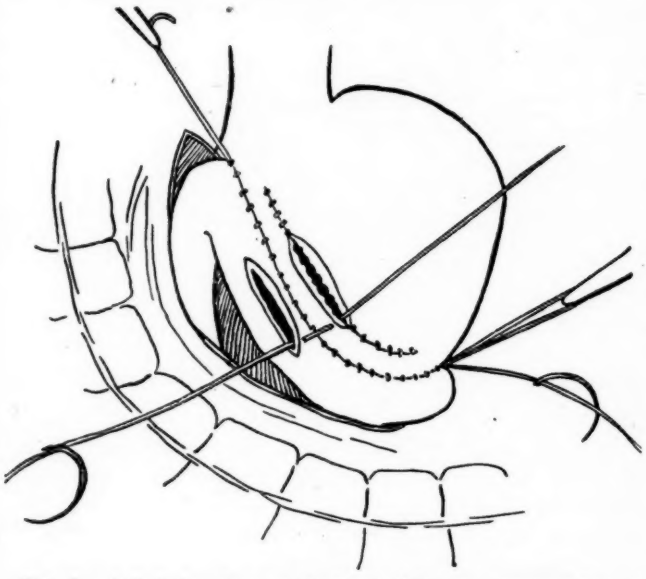


FIG. 2.—A hole has been made in the jejunum corresponding in size and position with the central gastric stoma; the first haemostatic suture is being inserted.

After the construction of the two valves the original cut end of the stomach assumes a gentle convex curve lying in a corresponding jejunal concavity. The stoma lies at a level slightly higher than the centre of the convexity and admits three crouched fingers.

Report on Cases

From April until the end of December, 1949, this type of anastomosis was employed in 50 gastric resections performed for the following conditions: duodenal ulcer, 33 (with pyloric stenosis, 15); gastric ulcer, 7; pyloric hypertrophy, 2; gastrojejunal ulcer, 5 (3 had double gastro-jejunal ulcers); carcinoma, 3.

There were 44 males and 6 females. All were traced and a questionary filled in concerning them; 35 were personally interviewed. There was one operative death on the second post-operative day. The operation was for a duodenal ulcer which had perforated on two previous occasions. Technically it had proved quite easy, and progress was uneventful until five hours before death, when tachycardia developed and increased to 220 (on the E.C.G.); limited exploration showed no abdominal abnormality. It is now considered that intravenous procaine might have averted this fatality. One late death occurred due to cardiac failure.

No severe dumper was found in the 48 survivors; two had moderate dumping symptoms and one complained of "occasional weakness" about two hours after meals containing carbohydrate in large amounts. Another had "slight attacks of indigestion after breakfast," another "fullness after a large meal." One man who had gained nearly a stone (6.4 kg.) in weight complained of symptomless vomiting about once a week; an *x*-ray film showed no abnormality.

The pre-operative and post-operative weights had been recorded in all of the cases; 5 lost weight, 6 maintained the pre-operative weight, and the remaining 37 gained an average of 10.3 lb. (4.7 kg.) each. Examination in a few months would undoubtedly show improvement among those who had had no gain in weight. One of those who lost weight was operated on late in December and developed a duodenal fistula; the two described as suffering moderate dumping symptoms both lost weight, one of these having been operated on for advanced carcinoma. In the remaining two the weight loss averaged 5 lb. (2.3 kg.).

Comment

Only when the 148 cases had been studied did it become apparent that other functional symptoms as well as dumping were related to the character of the gastro-jejunal discharge. Owing to the limited scope of the original investigation the pre- and post-operative weights had not been recorded in the series of 148 cases, but the impression was that few, if any, who were not operated on for pyloric stenosis gained weight and that many lost it.

Post-gastrectomy syndrome, bilious vomiting, and loss of weight are the main functional symptoms that may follow gastrectomy, and in my view they all result from the pre-precipitate discharge from the gastric remnant into the jejunum. All three are often present in the same patient, though any of them may be found separately; dumping of any severity usually results in loss of weight. It is not considered that the entry of bile into the gastric remnant is the common cause of bilious vomiting. For mechanical reasons the gastric remnant is incapable of containing bile for more than a few moments, and it is unlikely that it is less tolerant of bile than is the normal stomach. Bilious vomiting is simply one type of jejunal response to overloading; the vomit may contain nothing but bile because the maximum biliary secretion happens to take place at the time of the overloading and most of the food has already been passed on by the irritable jejunum. The same jejunal irritability with its resulting increased peristalsis is the probable cause of the loss in weight.

From the point of view of functional symptoms the Billroth I type of operation is far superior to any other resection, but it is feasible in only a small number of cases that require resection. The operation above was designed to limit functional post-gastrectomy symptoms by altering the character and speed of the gastro-jejunal discharge. *X*-ray examination of a series of 35 cases showed that it altered the character of the emptying, and in general caused moderate prolongation of the emptying time. The early results of the procedure appear to be far better than those from other types of resection with gastro-jejunal link-up, and one of the most gratifying aspects seems to be the number of patients who gained considerably in weight within a period of two months of operation, a finding the more significant because I began to favour extensive resections only a short time before beginning to operate by the above technique.

Summary and Conclusion

Post-gastrectomy syndrome is mechanical in origin and represents one type of jejunal response to precipitate gastric emptying.

Investigation of 212 cases shows the relation between the type of anastomosis and the occurrence of the post-gastrectomy syndrome.

It is considered that other functional symptoms, such as bilious vomiting and loss of weight, are likewise the result of the jejunal response to precipitate gastric emptying; in the absence of such emptying, loss of weight is not directly related to the extent of the gastric resection.

A valvular anastomosis for gastric resection is described and its effect in reducing the incidence of functional post-gastrectomy symptoms is shown in a review of the early results in 48 cases.

My thanks are due to the house-surgeons and nurses of Sir Patrick Dun's Hospital for the care which they expended on these patients; to the staff of the x-ray department for the radiological investigations, and to Mrs. J. Henry for the operation sketches.

REFERENCES

Custer, M.D., Butt, H. R., and Waugh, J. M. (1946). *Ann. Surg.*, **123**, 410.
Machella, T. E. (1949). Ibid., **130**, 145.
Muir, A. (1949). *Brit. J. Surg.*, **37**, 165.
Schechter, S. E., and Necheles, H. (1949). *Gastroenterology*, **12**, 258.
Visick, A. H. (1948). *Ann. R. Coll. Surg. Engl.*, **3**, 266.
Watson, A. B. (1947). *Brit. J. Surg.*, **34**, 353.

THE CAUSE AND MANAGEMENT OF FAILED FORCEPS CASES

BY

H. DEREK FREETH, M.B., B.S., M.R.C.O.G.
Late Registrar, Birmingham Maternity Hospital

Until 1888 it was not compulsory for a student to attend any case of labour before qualifying, and even now it is necessary for him or her to spend only enough time in a maternity hospital to attend the required number of 20 cases. It is possible to do this without seeing, even less treating, any abnormality; thus the student after qualification only too often enters practice without realizing, other than in theory, the serious difficulties to be encountered.

The comprehensive study of unsuccessful forceps deliveries reveals a wide field of the difficulties encountered in practical obstetrics. The subject therefore is of considerable importance not only to the practising obstetrician but also to the medical student. Indeed, these cases may well have their medico-legal aspect, and it is the operator who must accept full responsibility should legal complications ensue.

A clear appreciation of the dangers and pitfalls arising from the abuse of forceps should be an integral part of undergraduate teaching, and instruction should be directed not only on when to apply forceps but when not to; thus the newly qualified practitioner will benefit from the mistakes of others as well as from his own.

The largest series of cases (558) reported in the literature is that by Miller (1927). This series was discussed by Fletcher Shaw (1928) and Hendry (1928) at the Annual Meeting of the British Medical Association in 1928. Smaller series have been reported by Stacey (1931), Munro Kerr (1937), Feeney (1947), and Dobbie (1948).

For the purposes of this paper the definition of failed forceps may be taken as the unsuccessful application of obstetric forceps in an attempt to effect delivery. In considering the mechanism of this failure, I find that in practice there are two indications of failure: (*a*) the forceps slip off the presenting part, or (*b*) they fail to produce descent in spite of traction.

Present Investigation

The case records of 100 patients admitted under the honorary staff of the Birmingham Maternity Hospital during the years 1941–8 have been investigated. The principal causes of failure have been divided into six groups (see Table I). There were 62 forceps deliveries, 17 spontaneous deliveries, 8 internal versions, 6 caesarean sections, 6 craniotomies, and 1 breech extraction. The third stage was normal in all cases, apart from the manual removal of the placenta on two occasions. The cases are analysed in detail, group by group, and observations are made on their management.

TABLE I.—*Details of 100 Cases*

Group	Aetiology	No. of Cases	No. of Primiparae	Foetal Deaths	Maternal Deaths
1	Occipito-posterior position	34	28	15	1
2	Deep transverse arrest	22	19	8	—
3	Cervix not fully dilated	20	11	3	—
4	Brim disproportion (normal foetus)	8	4	4	—
5	Contracted outlet (occipito-anterior)	5	4	1	1
6	Miscellaneous:				
	Hydrocephalus	4	2	4	—
	Breech presentation	1	1	—	—
	Face, mento-anterior	1	1	—	—
	Face, mento-posterior	1	1	1	—
	Brow presentation	1	—	1	—
	Contraction ring	1	1	1	—
	Vaginal septum	1	1	—	—
	Ovarian cyst	1	—	—	—
	Total	100	73	38	2

Group 1: Persistent Occipito-posterior Position

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Normal	1	—	—	—
Face to pubes	1	—	—	—
Manual rotation (forceps)	26	1	—	9
Internal version	4	1	1	4
Craniotomy	2	2	—	2
Total	34	4	1	15

The one death occurred from post-operative shock; version had been attempted by the patient's own doctor after his failure to deliver with forceps. Craniotomy was attempted after transfer to hospital, but the cranioclast slipped off and a baby weighing 9 lb. 3 oz. (4.2 kg.) was delivered by internal version and breech extraction. In the other three cases internal version was undertaken, after forceps had again failed in hospital, in preference to craniotomy only because the foetal heart could still be heard. Rupture of a uterus already moulded upon the foetus after an unsuccessful attempt at delivery may easily be caused by version, and its use can rarely be justified.

In 26 cases the treatment by manual rotation to the occipito-anterior position followed by the application of forceps resulted in an easy forceps delivery, with one exception. It was the failure to diagnose the posterior position rather than the inability to rotate the head that gave rise to the unsuccessful extraction: the blind application of forceps to the foetal head without first ascertaining its position is done far too often; sooner or later it leads to disaster.

In those cases in which there is some disproportion and the head moulds through the brim, with the occiput posterior, disimpaction of the head is necessary to enable it to be rotated. To do this it must be pushed up above

the brim. Deflexion of the head follows, and it cannot now be pushed down through the brim ; thus a high-forceps delivery confronts the operator. When rotating the head in these difficult cases I have found that by placing the left hand firmly above the symphysis pubis, with the palm facing upwards as for the Pawlik grip, displacement of the head above the brim is prevented, flexion of the head is maintained, and a high forceps delivery is avoided.

Some of these cases seem to have been attempts at brim forceps delivery, with disproportion as well as a posterior position, and the high foetal mortality might well have been reduced by lower-segment caesarean section, much as we dislike doing it in the potentially infected case.

Group 2 : Deep Transverse Arrest

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Manual rotation (forceps delivery)	16	1	—	6
Kielland's forceps	4	—	—	—
Craniotomy	2	1	—	2
Total	22	2	—	8

Deep transverse arrest of the head was noted as the main cause of failed forceps delivery in an unexpectedly high percentage of cases. In three cases the condition had been recognized and Kielland's forceps had been unsuccessfully applied by the patient's own doctor. I believe, however, that in expert hands these forceps are extremely valuable in deep transverse arrest, as they can be used as a rotator. The foetal mortality in this series supports this view. If Neville's forceps are to be used, everything must be done to place the blades in the coronal diameter of the head. When they are placed over the forehead and occiput in a case of deep transverse arrest the baby is likely to suffer a tentorial tear with an intracranial haemorrhage (Lane-Roberts, 1935).

Group 3 : Cervix Not Fully Dilated

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Normal delivery	10	1	—	2
Low forceps	9	—	—	1
Cervix incised (internal version)	1	—	—	—
Total	20	1	—	3

The case in which the cervix was incised was that of an eclamptic patient whose doctor had attempted a forceps delivery. Forceps were also unsuccessful when applied in hospital ; internal version was performed, the cervix incised, and a live infant extracted weighing 5 lb. 10 oz. (2.6 kg.). This is an example of accouchement forcé, which to-day is no longer employed in the treatment of eclampsia.

In a recent case the total time between the onset of labour and the attempted delivery was three hours ; shortly afterwards the patient, a multigravida, had a normal delivery. This shows how even the cervix of a multigravida may prevent delivery when forceps are applied too soon.

In a few cases it seemed that the original application of forceps had been outside the cervix, resulting in severe lacerations. Malpraxis of this sort produces severe maternal shock, the lower uterine segment is torn, and the lateral fornices may be opened up with permanent disability as the sequel.

Group 4 : Brim Disproportion with Normal Foetus

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Lower-segment caesarean section	4	—	—	—
Internal version	1	—	—	1
Craniotomy	2	—	—	2
Walcher's position	1	—	—	1
Total	8	—	—	4

One case was interesting in that Walcher's position was tentatively tried for a few pains during which the head descended to mid-cavity. A normal delivery of a baby of 8 lb. 6¼ oz. (3.8 kg.) ensued, but it had a fractured parietal bone and died on the second day.

The condition of two of the mothers was regarded as too serious for caesarean section, and, as a high forceps attempt was also unsuccessful in hospital, craniotomy was performed, the baby being sacrificed in the maternal interest (see comment under " Discussion ").

In spite of potential infection from the previous manipulations in cases submitted to lower-segment caesarean section there were uniformly good results in mother and child.

Miller in his analysis found that dystocia from brim disproportion accounted for almost one-third of his cases, but Stacey's figure was 13%.

Group 5 : Contracted Outlet (Occipito-anterior Position)

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Difficult forceps delivery	5	1	1	1

The death in this series was due to post-operative shock following forceps delivery. In another case of contracted outlet dislocation of the right sacro-iliac joint with disruption of the symphysis pubis occurred during the forceps delivery of a live baby weiging 7 lb. 9½ oz. (3.4 kg.).

This group of cases demonstrates how pelvic outlet contraction can produce a difficult forceps delivery, and consideration must now be given to cases in which delivery cannot be accomplished by forceps alone. It is generally true that the head which passes the pelvic brim will pass through the outlet, but the exception to this dictum is the android type of pelvis with a flat sacrum and prominent ischial spines. If the patient is relatively free from potential infection a lower-segment caesarean section is indicated, but there still remains the group of cases in which infection is deemed present and the child alive and strong. Subcutaneous symphysiotomy or pubiotomy has been reserved for these cases, and fracture of the coccyx may be helpful when this bone is preventing extraction of the head. With a dead child craniotomy is the solution. In one of these cases I had to employ considerable traction to overcome the obstruction.

These cases illustrate the importance of assessing the outlet correctly at the antenatal clinic. Measurement of the intertuberischial diameter with the knuckles is not enough : the angle of the arch, the ischial spines, and the antero-posterior diameter should be carefully assessed. Morris (1947) states that, in all cases in which the antero-posterior diameter from the lower border of the symphysis to the tip of the sacrum is less than 10 cm. (4 in.), the outlet is definitely contracted. Browne (1946) states,

however, that if the transverse diameter is reduced to 8 cm. (3¼ in.) or less the outlet should be regarded as dangerously contracted. *X*-ray pelvimetry has enabled these diameters to be measured with considerable accuracy, and should be employed to confirm any clinical diagnosis of outlet contraction.

Group 6: Miscellaneous

Case	Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Foetal Deaths
Hydrocephalus	Perforation	3	—	3
	Int. version–perf.	1	—	1
Breech	Extraction	1	—	—
Mento-anterior	Normal delivery	1	—	—
Mento-posterior	Manual rotation (forceps)	1	1	1
Brow	Internal version	1	—	1
Contraction ring	Forceps	1	1	1
Vaginal septum..	Lower-segment caesarean section	1	—	—
Ovarian cyst ..	Caesarean hysterectomy	1	—	—
	Total	11	2	7

There were no maternal deaths in this group.

Hydrocephalus is not infrequently overlooked in pregnancy, and even during labour it may be mistaken for unruptured membranes or a large caput succedaneum on vaginal examination. The diagnosis in vertex presentations rests on finding a high presenting part, widely separated sutures and fontanelles, and a soft cystic head. I have observed that a fluid "thrill" may sometimes be obtained on bimanual examination, an impulse with two fingers from the right hand in the vagina being transmitted to the left hand holding the head above the symphysis pubis.

Astonishing though it may seem, perusal of previous published series reveals that breech presentation is not an exceptional cause of failed forceps. Most of these cases could have been prevented by adequate antenatal care; they show the importance of a vaginal examination in pregnancy as well as before applying forceps.

Observations on Maternal Mortality and Morbidity

It is to be expected that the maternal mortality and morbidity of this series will have been materially altered by chemotherapy, and such has proved to be the case. The maternal mortality in Miller's and in Stacey's series is 10%, in Munro Kerr's 7.1%, and in Feeney's 16.9%, while in this series it is only 2%. Notifiable cases of puerperal pyrexia amounted to 34%, and a considerable number of these patients were very slow in recovery in spite of chemotherapy; extensive lacerations were the main cause.

There were four cases of third-degree tears with one case of incontinence of faeces, and in another case a vesico-vaginal fistula developed. Scarring of the vaginal vault with laceration of the cervix was a common post-natal finding, but a brighter side of this otherwise dismal picture was that at the post-natal clinic no fewer than 75 patients had no complaints or physical signs attributable to their hazardous labours.

Failed forceps cases are particularly liable to develop prolapse of the uterus. Especially is this so when severe traction has been exerted with the cervix incompletely dilated: a great strain is put upon the uterine supports, particularly Mackenrodt's ligaments, and not infrequently they remain permanently stretched and prolapse follows.

Observation on Foetal Mortality and Morbidity

The foetal mortality rate in Miller's series was 64%, in Stacey's 52%, in Munro Kerr's 47.8%, and in Feeney's 60%, while in my series it was 34%, excluding hydrocephalus. This figure is nevertheless far too high.

The 62 babies that lived can be divided into 32 whose condition was fairly good at birth and 30 whose condition was poor. Five of the latter had facial palsies, two had fractured parietal bones, and a further six had bruises, scalp lacerations, and haematoma; but on eventual discharge from the hospital they were all regarded as satisfactory.

The largest baby weighed 11 lb. 8 oz. (5.2 kg.) and the smallest 5 lb. 10 oz. (2.6 kg.), the average weight for the whole series being 7 lb. 5 oz. (3.3 kg.), which shows it is not necessarily the large baby that gives rise to dystocia. On the other hand, in no less than 29% of the cases the length of gestation was over 42 weeks, suggesting that post-maturity played some part in the aetiology of the unsuccessful forceps delivery. Indeed, it is possible that ossification of the foetal skull bones, preventing moulding of the head, is the most important single factor. It is generally agreed that the post-mature infant does not stand up to a prolonged or difficult labour as well as the normal healthy baby born at term, and this may explain in part the high foetal mortality of this series.

Discussion

It is essential to assess the condition of the mother at once, as a severe degree of maternal distress with heavy acetonuria and a rapid pulse is frequent. In 33 cases the pulse rate on admission was over 100 and in 12 it was 120. A thorough abdominal examination is most important and often yields valuable information. Malpresentations or hydrocephalus may be found, and in one case an unsuspected twin pregnancy was discovered. The presence or absence of the foetal heart sounds may materially alter the treatment, as craniotomy is generally the best treatment if the baby is dead. A careful vaginal examination should next be made to ascertain the degree of dilatation of the cervix, the presentation, and the cause of the failure of the forceps, and to note any lacerations of the soft parts.

The first decision to be made is whether there is a chance of spontaneous delivery given time, and this decision rests on an accurate diagnosis of the cause of the failure to deliver. Generally the difficulty is not what method to adopt, but when to adopt it in the best interests of the mother and baby. It is sound practice to initiate treatment with anti-shock measures, and an intravenous 10% glucose drip is advisable, as nearly all cases have had chloroform anaesthesia, sometimes of long duration or on two occasions. Calcium gluconate, 10 ml. of a 10% solution, should be given into the drip to protect the liver against chloroform poisoning. The baby stands a second anaesthetic badly, and as repeated anaesthetics increase the foetal and maternal mortality one should suffice for delivery in hospital. Insertion of a self-retaining catheter at the time of a second instrumental delivery is a wise precaution to allow the bladder to regain its tone.

In this series 50% of the cases resulted from the failure of forward rotation of an occipito-posterior position, and 88% of these were in primigravidae. This is in agreement with Claye (1931), who states: "A point seldom stressed in connexion with occipito-posterior cases is that virtually all the trouble occurs in primigravidae. In multigravidae spontaneous delivery is the rule, even if short rotation occurs." Manual rotation had been attempted in some cases, but on applying forceps the head had ascended above the brim and an oblique grip was obtained, with the result that on traction the blades slipped off. A large number of difficult but nevertheless "successful" forceps deliveries of this type must be carried out in practice at the expense of the perineum and resulting in a stillborn or "cerebral" infant.

It would seem that failure of forceps delivery caused by the cervix not being fully dilated arises mainly through the inability to recognize that the cervix must be completely effaced and retracted over the presenting part before forceps may be safely applied in domiciliary midwifery. Occasionally the general anaesthetic given preparatory to the application of forceps causes the head to retract, and examination then reveals a rim of cervix. By mistaking the tight rim of the primigravid cervix four-fifths dilated for the soft dilatable cervix of the multigravida, which is no bar to delivery, the forceps are applied but without delivery of the head.

It was formerly held that caesarean section, even by the lower-segment route, had little or no place in the treatment of failed forceps cases owing to the serious maternal risk from infection. It is now submitted that the results of this series discredit that view, and that the introduction of chemotherapy has revolutionized the treatment of failed forceps cases caused by brim disproportion when the baby is still alive.

In view of the high incidence of puerperal infection it is advisable to begin penicillin therapy immediately in all cases. In spite of chemotherapy the puerperium is often prolonged, with urinary complications much in evidence; and as these cases are potentially infected and therefore a risk to normal patients isolation is recommended.

The case needing forceps delivery when the head is not showing at the vulva is the one that may lead to difficulty. Practitioners who are not experienced obstetricians would be wise to confine themselves to delivering at home only those patients needing a low-forceps delivery.

Summary and Conclusions

The records of 100 cases of failed forceps have been investigated.

Primigravidae comprise almost three-quarters of the patients.

Occipito-posterior positions and deep transverse arrest of the head account for over 50% of the cases; the cervix was not fully dilated in 20%.

Since the introduction of chemotherapy the maternal mortality has been materially lowered, as has the foetal mortality, but to a less extent.

Internal version has little or no place in the treatment of failed forceps delivery.

Brim disproportion should be treated by lower-segment caesarean section; the results from this operation were uniformly good in spite of the previous manipulations.

My thanks are due to the honorary staff of the Birmingham Maternity Hospital for constructive criticism and permission to publish.

BIBLIOGRAPHY

Baird, D. (1935). *Lancet*, 1, 801.
Bourne, A. W., and Williams, L. H. (1932). *Recent Advances in Obstetrics and Gynaecology*, p. 394. London.
Browne, F. J. (1946). *Ante-natal and Post-natal Care*, p. 290. London.
Claye, A. M. (1931). *Practitioner*, **126**, 611.
De Lee, J. B., and Greenhill, J. P. (1947). *Principles and Practice of Obstetrics*, pp. 657, 907. Philadelphia.
Dobbie, B. M. Willmott (1948). *Obstetrics and Gynaecology*, p. 220. London.
Feeney, J. K. (1947). *Irish med. J.*, **6s.**, 190.
Hendry, J. (1928). *British Medical Journal*, **2**, 185.
Kerr, J. M. Munro (1937). *Operative Obstetrics*, p. 471. London.
Lane-Roberts, C. S. (1935). *Practitioner*, **134**, 731.
Miller, Douglas (1927). *British Medical Journal*, **2**, 685.
—— (1928). Ibid., **2**, 183.
Morris, W. I. C. (1947). *Edinb. med. J.*, **54**, 90.
Phillips, L. (1926). *Lancet*, **1**, 113.
Shaw, Sir William Fletcher (1928). *British Medical Journal*, **2**, 188.
Stabler, F. (1947). Ibid., **2**, 878.
Stacey, J. E. (1931). Ibid., **2**, 1073.
Wrigley, A. J. (1946). *Proc. roy. Soc.*, **39**, 569.

USE OF RECTAL THIOPENTONE IN CHILDREN

BY

JOHN LORBER, M.B., B.Chir., M.R.C.P., D.A.

(From the Department of Child Health, University of Sheffield)

Many diagnostic or therapeutic procedures in paediatrics are painful or so unpleasant that the child will not co-operate. This is especially so in the first years of life, when even some painless procedures cannot be performed satisfactorily or without undue loss of time.

The commonest methods of sedation, such as the oral administration of chloral hydrate and of various barbiturates, are both unreliable and insufficient for many purposes. Thomson *et al.* (1949) found that with children over 1 year of age the inhalation of "trilene" gave satisfactory results during minor diagnostic procedures of short duration, such as lumbar puncture or aspiration of the chest. This method is not practical in infants or when access to the face or prolonged sedation is desired. Further, most children dislike the smell of anaesthetic agents and are afraid of a mask over their face.

In paediatric neurological practice complete examination of the fundus oculi and encephalography are procedures for which suitable sedatives are required. For the latter procedure the sedative action should last throughout the injection of the air and the subsequent radiological examination.

Rectal thiopentone has been used as the routine sedative in the streptomycin unit of the department of child health of the University of Sheffield since the beginning of 1949. This method was also used on a few occasions in other departments of the Children's Hospital, Sheffield, during the same period. It is felt worth while to publish the results to date, not because the method is original but because its value is not generally known.

The use of thiopentone by the rectal route was described by Weinstein (1939), Hooper (1942), and Weinstein and Light (1943). The last-named authors used the method in 1,500 cases, some 50 of them being children. They adopted a dosage scheme of 1 g. per 50 lb. (22.7 kg.) of body weight, and used thiopentone as a basal anaesthetic before inhalation anaesthesia or spinal analgesia. They were satisfied with its therapeutic action and noted no toxic effects. Burnap *et al.* (1948) reported similar findings in 300 children, and noted the absence of complications even after repeated administrations. Hunter (1943) used smaller doses (0.75 g. per 50 lb.), but his results in a small series were not so consistently satisfactory.

Material and Method

The results of 113 consecutive rectal administrations of thiopentone to 64 children between the ages of 3 months and 12 years are reported. Eleven were under 1 year of age. Fifty-six of the children were suffering from some form of tuberculosis, mostly meningitis and miliary tuberculosis; the other eight suffered from various neurological disorders. The examinations were usually carried out shortly after admission, when many of the children were extremely ill, and were often repeated on two to six occasions.

The indications for rectal thiopentone sedation were examination of the fundus oculi on 54 occasions, encephalography on 47, and other procedures (cystoscopy, laryngoscopy, etc.) on 12.

The following method was used. A small enema was given to constipated children a few hours before the proposed administration, to help the absorption of the drug and minimize the risk of its return after injection. No food was given for at least three hours before the thiopentone was due. A hypodermic injection of atropine, 1/150 or 1/100 gr. (0.43 or 0.65 mg.), was given half an hour before the thiopentone in almost all cases. This is not essential, but is useful in controlling salivation.

The thiopentone was dissolved in 20 to 40 ml. of warm tap-water and injected with a syringe slowly into the rectum by a rubber catheter. This injection took at least five minutes to complete. Afterwards the buttocks were held or strapped together to prevent some of the drug being returned. When this was not prevented, half the original dose was given half an hour later, if the child was not sufficiently sedated. The dose employed was 1 g. per 50 lb. of body weight. A detailed schedule is given in the accompanying Table.

Dosage Schedule of Thiopentone for Children Weighing up to 52½ lb.

Weight of Child	Dose of Thiopentone
lb. kg.	
7·5–12·5 (3·40–5·67)	0·2 g.
12·6–17·5 (5·71–7·93)	0·3 g.
17·6–22·5 (7·98–10·20)	0·4 g.
22·6–27·5 (10·25–12·47)	0·5 g.
27·6–32·5 (12·51–14·74)	0·6 g.
32·6–37·5 (14·79–17·01)	0·7 g.
37·6–42·5 (17·06–19·28)	0·8 g.
42·6–47·5 (19·32–21·54)	0·9 g.
47·6–52·5 (21·59–23·81)	1·0 g.

The child was usually asleep by the time the injection was completed, and then was left undisturbed lying on its side for at least another five minutes to ensure adequate sedation.

When examination of the fundi was planned the pupils were previously dilated with 1% homatropine drops.

Results

With two exceptions the results were uniformly satisfactory. Systematic examination of the eyegrounds, with a detailed description of all abnormalities and their precise location, could be completed in five minutes. As the desired effect of the thiopentone lasted for nearly an hour in all cases, it was possible for several observers to complete the examination or to demonstrate the findings to a class of students without tiring the patient. There was just enough time to complete an encephalographic examination. Although the children were sufficiently awake to take meals after some three hours they usually slept most of the next 24 hours. This was of great benefit in diminishing headache following encephalography. There was complete amnesia for 24 hours even if the child reacted to a painful stimulus, such as lumbar puncture.

In a few cases cystoscopy or laryngoscopy was performed successfully without any additional sedation, but if any surgical incision was needed—as, for example, the opening of an abscess or the making of cranial burr-holes—local analgesia had to be used as well.

In the absence of painful stimuli complete muscular relaxation was obtained. This was useful for abdominal palpation, usually carried out in addition to the original purpose of the sedation. An enlarged spleen or liver was easily felt. This method could therefore be used in particularly difficult cases for the diagnosis of abdominal disorders, though I have had no personal experience of rectal thiopentone given specifically for this purpose.

In no case was any general or local, immediate or remote toxic effect observed. Nevertheless, it is advisable to have oxygen and an injection of nikethamide or picrotoxin in readiness in case of excessive sedation.

One infant was in danger of dying after aspirating stomach contents, but made a complete recovery. Another child had severe spasms of coughing with temporary cyanosis. These two accidents were due to failure to observe the correct technique : one was fed just before thiopentone was given, and the other did not receive atropine.

Rectal thiopentone should not be given within three hours of a meal. It is contraindicated in the presence of respiratory obstruction, painful conditions of the rectum, or diarrhoea. Otherwise it is safe even for extremely ill and semiconscious children. It is an excellent method for ophthalmoscopic examination of babies.

Summary

Rectal thiopentone was given on 113 consecutive occasions to 64 children aged from 3 months to 12 years. The dose was 1 g. per 50 lb. of body weight. Complete and satisfactory sedation was obtained for examination of the fundus oculi, encephalography, and other procedures not requiring surgical incision.

No local or general toxic effects were observed.

Detailed technical instructions are given.

Acknowledgments are due to Professor R. S. Illingworth and Dr. T. Colver for access to their cases.

REFERENCES

Burnap, R. W. Gain, E. A., and Watts, E. H. (1948). *Anesthesiology*, **9**, 524.
Hooper, C. L. (1942). Ibid., **3**, 458.
Hunter, A. R. (1943). *Brit. J. Anaesth.*, **18**, 126.
Thomson, J., Grewar, D. A. I., and Grounds, J. G. (1949). *British Medical Journal*, **2**, 1449.
Weinstein, M. L. (1939). *Curr. Res. Anesth.*, **18**, 221.
—— and Light, G. A. (1943). Ibid., **22**, 68.

CONVULSIONS IN CHILDHOOD

AN EPIDEMIOLOGICAL NOTE ON THEIR ASSOCIATION WITH EPILEPSY, ECLAMPSIA, AND STILLBIRTH

BY

T. W. BUCHAN, M.B., D.P.H., F.R.F.P.S.

Nathan and Ransford (1949) have adduced evidence in favour of the claim that convulsions in infancy are the early manifestation of epilepsy, and Grantly Read (1950) has drawn attention to the possible relationship which they may have to certain types of convulsion in pregnancy and labour. Since the commonest cause of convulsions in pregnancy and labour is eclampsia, which is not infrequently associated clinically with stillbirth, it is of interest to note that certain epidemiological kinships exist between infantile convulsions and epilepsy, eclampsia, and stillbirth. These kinships may be considered under (1) secular trend, (2) seasonal variation, and (3) regional distribution, limiting the investigation to mortality data relating to England and Wales.

Secular Trend

Mortality from these diseases has been declining for many years, and the latest available figures show that unprecedentedly low rates now obtain. Mortality from convulsions in infants under 1 year has fallen from 9.68 per 1,000 births in 1911 to 0.35 in 1947, and deaths at all ages from epilepsy show a decline—interrupted, however, during the two world wars—from 72 per million in 1911 to 29 in 1947. Mortality from eclampsia has fallen sharply since

its peak in 1919, and stillbirths, which became registrable in 1927, have declined since 1935. It may be noted that neonatal mortality, which has close ties with stillbirth, has declined from 41 per 1,000 births in 1911 to 23 in 1947. This declining trend, which is in common with that given by many other diseases, does not impart distinction to the group, though it deserves mention as a feature of the individual components of it.

Seasonal Variation

It will be noted (Table I) that in the years shown the highest number of deaths from infantile convulsions and epilepsy occur during January and February, and the lowest in August. The curves, in fact, are fairly parallel though the amplitude is less in the case of epilepsy. Deaths from eclampsia are above the average from January until July, and stillbirths from January until May, and both fall to a minimum in November. The seasonal variation of mortality from eclampsia is roughly similar to the curve given by stillbirth. It should be added here that, in the Tables in this study, deaths assigned to the toxaemias of pregnancy and to the puerperal toxaemias have been included in the estimation of mortality from eclampsia as well as deaths associated with convulsions.

TABLE I.—*Seasonal Distribution of Deaths from Infantile Convulsions (Under 5 Years of Age), Epilepsy, Eclampsia, and of Stillbirths, Corrected for Difference in Length of Months, in the Years 1939–45, in England and Wales*

	Deaths			
	Infantile Convulsions	Epilepsy	Eclampsia	Stillbirth
January ..	582 (12%)	1,151 (10%)	241 (9%)	13,663 (9%)
February ..	557 (11%)	1,151 (10%)	237 (9%)	13,760 (9%)
March ..	502 (10%)	1,099 (10%)	234 (9%)	14,098 (9%)
April ..	481 (10%)	989 (9%)	256 (9%)	13,698 (9%)
May ..	374 (8%)	939 (8%)	249 (9%)	13,476 (9%)
June ..	338 (7%)	895 (8%)	230 (9%)	12,782 (8%)
July ..	326 (7%)	792 (7%)	228 (9%)	12,556 (8%)
August ..	270 (6%)	768 (7%)	215 (8%)	12,092 (8%)
September ..	302 (6%)	799 (7%)	202 (7%)	12,170 (8%)
October ..	323 (7%)	793 (7%)	209 (7%)	12,234 (8%)
November ..	374 (8%)	888 (8%)	181 (7%)	11,968 (8%)
December ..	440 (9%)	978 (9%)	228 (9%)	12,647 (8%)
Total ..	4,869	11,242	2,710	155,134

Regional Distribution

The regional variations in mortality are closely similar (Table II), a feature which is revealed by the correlations between the rates. The coefficients are all of the order +0.8 or +0.9, and are highly significant in the statistical sense. The greatest coefficient is given by epilepsy and stillbirth in the triennium 1945–7 ($r = +0.93$), but its importance is diminished by the fact that the epilepsy rate is not adjusted to the differing age and sex constitution of the regions. This defect, however, is less than might be expected, because deaths from epilepsy are not heaped up in one or two age groups, but fairly well spread throughout all, and, moreover, the regional variations shown are considerable.

The stillbirth rates used in this study, it should also be noted, are not corrected for differences in biological factors such as age and parity of mother, but it is known that these do not influence the regional variations to more than a relatively slight extent. The coefficient between stillbirth and mortality from infantile convulsions in the 1932–7 period is +0.87. The coefficient relating to the same heads in 1939–46 is reduced to +0.78, but is still highly significant. The reduction is possibly due to changes caused by evacuation in the war years. In the correlation between puerperal toxaemia and infantile convulsions during 1939–46, $r = +0.80$. The interesting point about these coefficients is that they reveal, within the limits of the regional basis, statistical relationships between infantile convulsions, epilepsy, eclampsia, and stillbirth which are at least as important as the relationship shown between eclampsia and stillbirth, where $r = +0.77$. And, as this last relationship coincides with the known clinical association of eclampsia and stillbirth, it seems natural to ask if the other relationships may not also indicate equally important aetiological factors in common.

TABLE II.—*Regional Stillbirth Rates and Regional Mortality from Infantile Convulsions, Epilepsy, and Eclampsia.* NOTE: *For the Geographical Constitution of the Regions See the Registrar-General's Review, Any Recent Issue*

Region	Average Annual Stillbirth Rate per 1,000 Live Births and Stillbirths			Convulsions. Proportion of Deaths Under 1 Year to 1,000 Births		Epilepsy. Crude Death Rate per Million Persons Living, 1945–7	Average Annual Death Rate from Eclampsia per 1,000 Live Births and Stillbirths, 1939–46
	1932–7	1939–46	1945–7	1932–7	1939–46		
	1	2	3	4	5	6	7
Greater London ..	32	27	23	0·42	0·19	73	0·42
Remainder of S.E. ..	35	28	24	0·84	0·35	79	0·54
North I ..	42	35	29	3·75	2·55	110	0·64
North II ..	42	33	29	2·39	1·10	98	0·60
North III ..	46	35	28	1·98	0·88	86	0·55
North IV ..	46	36	29	2·11	1·19	107	0·55
Midland I ..	40	31	26	1·29	0·56	92	0·56
Midland II ..	41	31	26	2·08	1·07	89	0·55
East ..	38	31	26	1·34	0·57	103	0·52
South-west ..	40	31	25	1·31	0·50	89	0·68
Wales I ..	55	40	32	4·36	2·67	134	0·77
Wales II ..	52	38	31	4·40	2·65	121	0·82

$r14 = +0.87$, $r16 = +0.89$, $r25 = +0.78$, $r26 = +0.88$, $r27 = +0.77$, $r36 = +0.93$, $r46 = +0.89$, $r56 = +0.93$, $r57 = +0.80$, $r67 = +0.83$. *Note:* In each case the first two numbers refer to columns—e.g. r14 means coefficient of correlation of columns 1 and 4.

A further point of correspondence between epilepsy and infantile convulsions is that they both show an excess of male mortality—epilepsy at all ages (Robertson, 1949). In this they resemble stillbirth and neonatal mortality.

The evidence given in this note suggests that convulsions in childhood may be related to convulsions in pregnancy and labour and that they are the early manifestation of epilepsy. The correspondences suggest that common factors are at work, one of which may be the distribution of the incidence of infectious diseases. Further investigation of this wider field, which now includes stillbirth, is justifiable.

Summary

Attention is drawn to some epidemiological kinships between infantile convulsions, epilepsy, eclampsia, and stillbirth.

Mortality trends have been falling for many years, with the possible exception of stillbirth, for which the rate was not recorded until 1927. The neonatal rate shows a corresponding decline.

The seasonal curves of mortality from infantile convulsions and epilepsy are similar, and deaths from eclampsia show a rough correspondence with stillbirths, though the seasonal variation of stillbirths is not so great. In all cases mortality is highest in the first half of the year.

A close correspondence is noted in the regional distributions of mortality, and reference is made to the excess of male deaths in infantile convulsions and epilepsy and in foetal and neonatal mortality.

The seasonal distribution of stillbirths and the rates relating to eclampsia and epilepsy were calculated from data kindly supplied by the Registrar-General. The other rates were calculated from data published in the Registrar-General's Reviews.

References

Nathan, P. W., and Ransford, P. M. (1949). *British Medical Journal*, **2**, 421.
Read, Grantly D. (1950). Ibid., **1**, 279.
Robertson, W. (1949). *Hlth Bull. Dept Hlth Scotland*, **7**, 1, 20.

Medical Memoranda

Intestinal Obstruction During Late Pregnancy Caused by Volvulus of Sigmoid Colon

The aetiology of intestinal obstruction in pregnancy has been fully discussed by Matthews and Mitchell (1948). They state that the incidence of the condition has been variously assessed by different writers as between 1 in 7,000 and 1 in 68,000 pregnancies. At the North Herts and South Beds Hospital, where no case is admitted before the 28th week, two cases of intestinal obstruction have occurred in 7,651 deliveries between the years 1940 and 1949.

I have previously referred to the difficulties of diagnosis and enumerated the possible methods of treatment (James, 1946). The following case, in which the obstruction occurred at the 36th week of pregnancy, illustrates very clearly the chief cause of errors in diagnosis—namely, to mistake the pains of obstruction for the onset of labour. It is also intended to emphasize the fact that, provided an early diagnosis is made, major surgical procedures can be successfully carried out in the abdomen at the end of pregnancy without the added risk of preliminary or subsequent caesarean section.

CASE REPORT

A primipara aged 26 was admitted to the maternity unit at the 36th week of pregnancy on April 5, 1949, because she was thought to be in labour. Slight attacks of abdominal pain first began on April 3. The pain was described as lower abdominal, and passed through to the back. On April 4 pains became more severe and occurred at five-minute intervals. She vomited three times during the day.

She was first admitted to a surgical department, but as it was considered that the uterus was contracting with each pain, she was later transferred to the maternity unit, where an experienced midwife reported "pains every five minutes." At 10 p.m. on April 5 her temperature was 100° F. (37.8° C.) and her pulse rate 96. Her tongue was dry and furred. The abdomen appeared unduly distended, and the uterus, which corresponded in size to a 36-weeks pregnancy, was pushed over to the left so that the fundus protruded in the left flank. The rest of the abdominal cavity seemed to be filled by a large bulge which was resonant on percussion. No rigidity or tenderness was detected, but with each pain the whole abdominal wall became tense so that it was impossible to say whether the uterus was contracting or not. The foetus was in the L.O.P. position with the vertex lightly engaged in the pelvis. The foetal heart was audible in the left flank, and many borborygmi were heard on the right side of the abdomen. A vaginal examination revealed that the cervix was not taken up and that the external os was closed.

An enema given at 11 p.m. produced neither faeces nor flatus. She was kept under observation for another hour while 1,000 ml. of glucose-saline was given intravenously. During this time the pains recurred every five minutes with clockwork regularity, and from her appearance it seemed almost certain that she was in labour. A second vaginal examination was made, but the cervix was still closed. Her pulse rate had risen to 110. It was clear that she was not in labour at all, and at midnight on April 5 it was decided to perform laparotomy.

Operation.—A stomach tube was passed, and under cyclopropane anaesthesia the abdomen was opened by a midline subumbilical incision. Blood-stained fluid was encountered and a loop of colon distended to about 5 in. (12.7 cm.) in diameter presented; when eviscerated, this measured about 18 in. (45.7 cm.) in length. It was found to be a volvulus of the sigmoid colon which had passed behind the uterus and had twisted four times in a clockwise direction (Fig. 1). No necrotic areas were seen, and after untwisting the loop a flatus tube was passed per rectum, and the distension was immediately relieved.

The next problem was to replace the deflated loop on the left side of the abdomen without eventrating the uterus. This was eventually done by slipping the loop of bowel over the fundus of the uterus. The abdomen was then closed without drainage, and the flatus tube left in position.

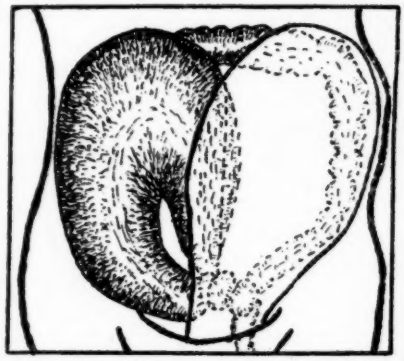


FIG. 1.—Diagram showing relative positions of uterus and volvulus, as seen at laparotomy.

On returning to the ward her condition was satisfactory. She was given another 1,000 ml. of intravenous saline by slow drip and frequent injections of morphine to prevent the onset of labour. Progesterone was not given, as it is doubtful whether the effect is beneficial or harmful when attempting to postpone labour.

Her post-operative progress was uneventful. Labour started spontaneously three weeks after the operation, by which time the scar was no longer painful. She was delivered easily of a living child weighing 7 lb. (3.2 kg.) and the puerperium was normal.

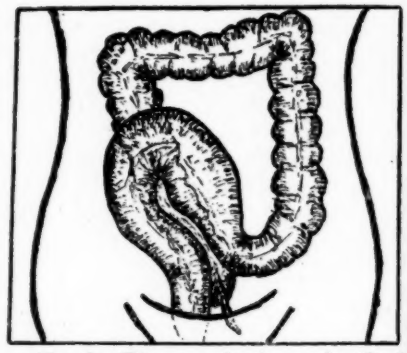


FIG. 2.—Diagram of colon as visualized in the puerperium by radiography, showing enormous dilatation persisting in loop of sigmoid colon.

Before her discharge from hospital a barium enema was given, and this showed that an enormous loop of sigmoid colon was still present. A barium meal given a week later demonstrated a long ascending colon, and the caecum seemed to be resting in the left iliac fossa. The appearance of the whole colon as visualized by the two *x*-ray examinations is shown in Fig. 2. She was referred for further surgical treatment at a later date in order to prevent recurrence of the volvulus.

COMMENT

In this case the cause of the obstruction was not appreciated before operation, but it was clear that laparotomy was required. The period of observation was not prolonged by attempts at radiological diagnosis. It was decided not to temporize by duodenal suction or postural treatment, and the time thus gained enabled the minimum surgical procedure to be carried out and caesarean section to be avoided.

D. W. JAMES, M.B., B.S., M.R.C.O.G.,
Obstetrician and Gynaecologist, North Herts and South Beds Hospital.

REFERENCES

James, D. W. (1946). *British Medical Journal*, **1**, 485.
Matthews, S., and Mitchell, P. R. (1948). *J. Obstet. Gynaec. Brit. Emp.*, **55**, 653.

Aerocele

The following case is interesting enough to be placed on record.

CASE REPORT

A miner aged 24 was admitted to the Grey River Hospital on April 12, 1949, complaining of recurring headaches. While playing Rugby League football for New Zealand in England on December 20, 1947, he was tackled and thrown violently to the ground, which he struck with the back of his head. It was a severe knock, but he can remember his tackler talking to him and he was not knocked out. He continued playing, but did not play intelligently and made several blunders. He had a headache the rest of the time and can remember very little of the game. After the game he became slightly drunk and vomited. He got up next day and felt fairly well, and played for the rest of the tour. Apart from two or three headaches every week, he felt fairly well.

At the end of the tour he returned to New Zealand and was quite well except for his headaches, which were about the same. These were fairly severe and would last for two to three hours. In March, 1949, he was at the races when a headache came on which was much worse than any he had had before. He went to bed and when he got up next morning his headache was severe and he vomited. Later he felt all right when lying in bed, but as soon as he got up in the mornings he vomited. Two "blackouts" have occurred, one in 1940 before his accident and one in 1948 after his return from England.

On examination he was seen to be a well-built athletic type of young man of normal intelligence and in no distress. Nothing abnormal was found on full clinical examination. His pupils were equal and reacted to light and accommodation. There was no papilloedema. A radiograph of the skull showed a completely opaque right frontal sinus and a cyst containing air and fluid in the right frontal lobe of the brain. Diagnosis, therefore, could only be a right frontal aerocele.

He was transferred to Dunedin Hospital where a right frontal craniotomy was performed by Mr. Anthony James. The dura was exposed and found to be rather tense. A needle was inserted into the right frontal lobe and a quantity of gas and chocolate-coloured fluid was aspirated from the air-containing cyst. The dura relaxed and the brain was then retracted. This exposed a prolongation of brain tissue which was adherent to the dura at the posterior wall of the frontal sinus, and a sharp spicule of bone pierced the dura at the point of attachment. The prolongation was sealed with the diathermy and divided, and beside the spicule of bone piercing the dura there was a small dural defect presumably entering the frontal sinus. The spicule of bone was chiselled off, and a patch of temporal fascia was removed and sutured through the dura over the posterior part of the frontal sinus.

The patient made a good recovery and has had no further recurrence.

COMMENT

One can only conclude that this patient sustained a fracture through the right frontal sinus in December, 1947. This was probably the cause of the spicule of bone piercing the dura and extending into the frontal lobe. Some haemorrhage would occur into the frontal sinus. The patient would thus have a communication from the nose into the frontal sinus and thence through the dural defect into the frontal lobe of the brain, and every time he blew his nose he would blow air into his frontal lobe, forming the cyst, which lay at a depth of 1 cm. from the surface. In the course of time the cyst had enlarged with the addition of air so that some of the symptoms of increased intracranial tension were present. It is remarkable that the patient did not develop a meningitis from infection through the nose.

J. H. MCINTYRE, M.D.,
Grey River Hospital, Greymouth, New Zealand.

Large Post-Rectal Dermoid

Post-rectal dermoids, derived from the post-anal gut, are rare, and the following case seems worthy of record.

CASE REPORT

A woman aged 26 attended the out-patient department on October 27, 1947, complaining of sterility. She had been married eighteen months and had been told (incorrectly) that a lump at the bottom of her spine was a spina bifida, and at once she declared that in no circumstances would she have it operated on. Her periods were regular, lasting four to five days. Her general health was excellent.

On examination her abdomen felt full and there was a sense of resistance in the suprapubic region. A cystic swelling (sacro-coccygeal), overlapping and below the tip of the coccyx, was present. The vagina was found to be compressed and to run forward close behind the symphysis pubis and the cervix could only just be touched with the finger. The anterior curve of the vagina was due to the presence of a cystic swelling occupying the hollow of the sacrum and nearly filling the pelvic cavity. The rectum ran anterior to the swelling in a curve closely approximated to the vagina and through its posterior wall bony hard nodules about the size of hazel nuts were palpable.

A diagnosis of post-rectal dermoid with sacro-coccygeal tumour was made. This was confirmed by radiographs which showed the presence of teeth and bone in the cyst, the outline of which practically filled the pelvis.

Operation.—On November 10, with the patient in the Trendelenburg position, a midline incision was made. Immediately under the abdominal wall in the lower half of the incision the bladder and uterus presented, and immediately behind the uterus above the level of the pelvic inlet was the recto-sigmoidal junction. The top of the cyst occupied the remainder and greater part of the pelvic inlet. The peritoneum over the cyst, to the right of the rectum, was incised. A plane of separation was found only with difficulty: there was no question of the cyst "shelling out." It was separated, after evacuation of much pultaceous matter, from the rectum in front and from the sacrum behind to the level of the coccyx, and at this level with long curved flat scissors it was separated from the remaining solid column of tissue continuous with the external coccygeal tumour. The pelvic peritoneum was closed over the cavity. Haemorrhage from pelvic veins was brisk and a transfusion was necessary. The patient made an otherwise uneventful recovery, being discharged on December 6.

Six weeks later, on examination with a finger in the rectum and the thumb on the sacro-coccygeal tumour, there seemed to be a mass of tissue about 1½ in. (3.7 cm.) thick in the coccygeal region. Above this the rectum was in relation to the sacrum.

The specimen consisted of a large multilocular cyst, 8 in. (20 cm.) long and the diameter of the pelvis, and contained bone, teeth, hair, and much sebaceous matter.

I am indebted to Dr. Ainsley, of West Hartlepool, for a note on her subsequent confinement. She was successfully delivered of a full-term infant on March 16, 1949. Forceps were necessary, and apart from a tear which needed stitching the confinement went normally.

RAYMOND PURVIS, F.R.C.S.,
Surgeon, Royal South Hants and Southampton Hospital.

Reviews

THE IMPORTANCE OF BURNS

A New Approach to the Treatment of Burns and Scalds. By Leonard Colebrook, F.R.S., F.R.C.O.G. (Pp. 174; illustrated. 12s. 6d.) London: Fine Technical Publications, 39, Wilton Road, S.W.1. 1950.

This book is an account of the author's very important work demonstrating how to minimize the effects and reduce the mortality due to burns and scalds. The study began in Glasgow and was then continued in the Birmingham Accident Hospital. From 1945–8, among 490 burns and scalds treated at that hospital the death rate was only 2.7%. This is a striking contrast to the rate of 26% recorded in London in the early days of this century. The points in treatment on which Dr. Colebrook lays stress are the avoidance of haemoconcentration by giving plasma at once and the elimination of sepsis. Not only is the elimination of sepsis important because it reduces mortality, but also because it saves unnecessary pain. His experience has shown that "all the misery of burned people in the past was due to inflammation." If sepsis is avoided early skin grafting becomes possible, and in this way the stay in hospital and the period of incapacity can be reduced by 50%.

Dr. Colebrook points out, however, that these objects can be attained only by a complete recasting of arrangements for dealing with these difficult cases. He therefore proposes that centres for the treatment of burns should be established, and he then proceeds to describe in detail how these centres can be organized and what staff is required to man them. His proposals are put forward cogently, but it is possible to read between the lines that he thinks little attention will be paid to them. We are slow in this country to adopt improvements which involve changes in organization, as, for example, in the management of operating-theatres for the elimination of sepsis there. We refuse to be moved by early enthusiasm, and when the enthusiasm has cooled we fold our hands in resignation.

Dr. Colebrook has made a most important contribution to medical treatment. His book should be read by all, for it demonstrates what contributions can be made by the investigator who shows how scientific knowledge can be applied in practice.

J. H. BURN.

A VETERAN GYNAECOLOGIST

Tom Cullen of Baltimore. By Judith Robinson. (Pp. 435; illustrated. £1 1s.) London: Geoffrey Cumberlege (Oxford University Press). 1949.

"A great gynaecologist, an inspiring and generous leader, and a man whose genius is excelled only by his humanity." These words are not taken from an obituary notice. They appeared in a review in the *British Medical Journal* (October 7, 1939) of two volumes of the collected papers of the Johns Hopkins gynaecological department; and they referred to the subject of this book, now a veteran of 82. His life has been written by a gifted and enthusiastic fellow Canadian, who obviously felt that Dr. Cullen was a heaven-sent gift for a biographer.

I think I enjoyed most the chapters dealing with Cullen's background. The son of a Wesleyan minister with an English wife, a large family, and a small income, Cullen had a puritanical upbringing strongly infused with ideas about the value of work and character. Nothing in the book is more touching than the evidence of Cullen's love for his parents and his devotion to his widowed mother. After the premature death of his father he took on his shoulders the education of his younger brother and sisters at a time when he was far from well off. During his college career he added to the family income by delivering newspapers. This involved very early rising, "at first by compulsion, afterwards by choice," and to this habit and his capacity for sleep at any time and in any position he attributes his ability to do what ought to be done. After a distinguished college career he was appointed one of the residents in the Toronto hospital. There he saw Kelly of Baltimore operate, and resolved to become a surgeon. He followed his fellow student Lewellys Barker to Baltimore and was attached to Kelly's pathological laboratory, where he spent several hard-working years.

Right through the book it is made plain that Cullen regards pathology as the only true basis for surgery, and many tributes are paid to Kelly as a brilliant leader and a most generous friend. It was Kelly who lent him the money to go to Germany, where nearly all the early Johns Hopkins men seem to have got inspiration.

No attempt will here be made to detail what gynaecology and abdominal surgery owe to Cullen. It is a part of medical history, but many interesting and personal sidelights emerge in this volume. He has written many books on different aspects of his work, and says, incidentally, that he reckons he "lost between sixty and seventy thousand dollars on them; but it was worth it." He pays a great tribute to Dr. Hurd, who not only insisted on his publishing, but was the man chiefly responsible for the inception of the famous Johns Hopkins Bulletins.

Cullen found time for many causes outside surgery. He was for many years prominent in the work of the American Medical Association. He was the originator in the U.S.A. of the campaign for the earlier recognition of cancer, in which he at first incurred much opposition from many of his colleagues. He was active in many civic enterprises which had to be fought for. As a friend said of him: "Tom never asked for anything for himself. He never asked for anything unreasonable, and when he once started he never stopped. Never." His successes with his "wants" are told, often with humour, and they explain how it is that Cullen is one of the most honoured of Baltimore's citizens. The book is a handsome one with many good portraits and a full bibliography. I have only one criticism to make of it: I think it might have been even better if the author had been less expansive in parts.

ALFRED COX.

CHANGING VIEWS ON RHEUMATISM

The Rheumatic Diseases. By G. D. Kersley, M.A., M.D. (Cantab.), F.R.C.P., T.D. Foreword by Sir Francis R. Fraser, M.A., M.D.Ed., F.R.C.P. Third edition. (Pp. 143; illustrated. 15s.) London: William Heinemann Medical Books. 1950.

Since the second edition of this book was published in 1945 an entirely new approach to the rheumatic diseases, and indeed to medical thought in general, has been made possible by the work of Hench and his colleagues at the Mayo Clinic and by Selye's theory of the adaptation syndrome. As a result of this a flood of new work has been poured out in the literature, so far mostly in America,

but also in this country and elsewhere, and the writer of any new book on rheumatism must face the difficulty of deciding how far he can include very recent and perhaps highly speculative and unconfirmed work. If the author has not been entirely successful in avoiding the appearance of having rushed to include the very latest work up to the moment of going to press, it is at least a good fault and his selection has been judicious. His chapter on endocrinology describes in a simple manner much that is entirely absent from other English textbooks on this subject. It is unfortunate that there has been an error in the plate giving the formulae of some important steroids, 17-hydroxy-11-dehydrocorticosterone and 11-dehydrocorticosterone being confused.

The other sections on the clinical features and treatment of the rheumatic diseases are extremely sound and of a remarkable conciseness, coupled with readability and completeness. If the chapter on fibrositis tends to lag behind more recent approaches to non-articular rheumatism it follows none the less the best of the traditional lines of thought, and much that is unsound has been avoided. Dr. Kersley reviews in a highly sceptical spirit the place of the disk lesion as an aetiological factor in sciatica, and he stresses the other causes of this syndrome, particularly those due to ligamentous and soft-tissue lesions. He goes so far as to suggest that neurological signs are not necessarily indicative of nerve-root pressure and that diminution of the ankle jerk may occur in fibrositic conditions. Indeed, he claims that all the clinical findings of a prolapsed disk may be reproduced in a severe attack of fibrositis, a view which must make the differential diagnosis extremely difficult—which it no doubt is. But these are minor criticisms of an otherwise first-class book which reflects the best of modern rheumatological teaching in a form suitable for students, postgraduates, and general practitioners.

W. S. C. COPEMAN.

EXAMINATION OF THE NERVOUS SYSTEM

Practical Neurological Diagnosis. With special reference to the Problems of Neurosurgery. By R. Glen Spurling, M.D. Fourth edition. (Pp. 268; illustrated. £1 17s. 6d.) Oxford: Blackwell Scientific Publications. 1950.

This is the fourth edition of Spurling's book to appear since 1935, the main changes since the last edition being a complete revision of the chapter on the cerebellum and the addition of an account of the hypothalamus and a glossary of neurological terms. The latter is an unusual and useful feature in a book of this type. A short account is given of history-taking in neurological cases, and the methods of examination of the nervous system are described along orthodox lines. The author's description of Romberg's test, however, differs fundamentally from the method of performing the test and of interpreting it usually adopted in this country. He describes a positive test as swaying or falling when the patient stands with his eyes open, while it is usual to define a positive test as increase of unsteadiness when the eyes are closed. If the latter criterion is adopted a positive test is indicative of impairment of posterior-column function and not of cerebellar disease. A description of abnormalities in the cerebrospinal fluid and a short but helpful description of the role of radiology in neurological diagnosis complete the volume. The book is a valuable elementary introduction to examination of the nervous system and to interpretation of abnormal neurological signs.

J. W. ALDREN TURNER.

BOOKS RECEIVED

Review is not precluded by notice here of books recently received

The Psycho-Analytic Reader. Edited by R. Fliess, M.D. (Pp. 358. 18s.) London: The Hogarth Press and the Institute of Psycho-Analysis. 1950.

Popular Fallacies. By A. S. E. Ackermann, B.Sc., F.C.G.I., M.Cons.E., Hon.F.S.E., A.M.I.C.E., M.R.S.I. Introduction by Sir R. Gregory, Bt., F.R.S. 4th ed. (Pp. 843. 30s.) London: Old Westminster Press. 1950.

Aids to Materia Medica. By G. H. Newns, M.D., M.R.C.P. 4th ed. (Pp. 204. 5s.) London: Baillière, Tindall and Cox. 1950

Guide to Good Health. By an Octogenarian Doctor. (Pp. 11. 1s.) London: H. K. Lewis. 1950.

Progressive Professional Nursing. By M. E. Grey, S.R.N., S.C.M. (Pp. 104. 6s.) Edinburgh: Livingstone. 1950.

Medicine and Mankind. By A. Sorsby, M.D., F.R.C.S. 2nd ed. (Pp. 232. 12s. 6d.) London: Staples. 1950.

The Health of the People. By S. Leff, M.D., D.P.H. (Pp. 288. 12s. 6d.) London: Victor Gollancz. 1950.

Gastroscopy. By R. Schindler, M.D., F.A.C.P. 2nd ed. (Pp. 433. £7 10s.) London: Cambridge University Press. 1950.

Children with Mental and Physical Handicaps. By J. E. W. Wallin, Ph.D. (Pp. 549. 42s.) London: Staples. 1950.

Primary Carcinoma of the Vagina. By R. G. Livingstone, M.D. (Pp. 73. 15s.) Springfield, Illinois: Charles Thomas. Oxford: Blackwell Scientific Publications. 1950.

Employment Relations in a Group of Hospitals. By J. Woodward, M.A. (Pp. 115. 5s.) London: Institute of Hospital Administrators. 1950.

Essentials of Urology. By J. C. Ainsworth-Davis, M.A., M.D., B.Ch., F.R.C.S., F.R.C.S.Ed. (Pp. 734 50s.) Oxford: Blackwell Scientific Publications. 1950.

Menstruation and Its Disorders. Edited by E. T. Engle (Pp. 358. 37s. 6d.) Springfield, Illinois: Charles Thomas. Oxford: Blackwell Scientific Publications. 1950

Clinical Nutrition. Edited by N. Jolliffe, M.D., and others. (Pp. 925. 90s.) London: Cassell. 1950.

The Care of the Aged Sick. (Pp. 11. 4d.) London: St. John Ambulance Association. 1950.

An Introduction to Pathology. By G. Payling Wright, D.M., F.R.C.P. (Pp. 569. 30s.) London, New York, and Toronto: Longmans Green. 1950.

Laboratory Manual of Biochemistry. By B. Harrow, Ph.D., and others. 3rd ed. (Pp. 149. 11s. 6d.) Philadelphia and London: Saunders. 1950.

Proctology in General Practice. By J. Peerman Nesselrod, B.S., M.S., M.Sc.(Med.), M.D., F.A.C.S., F.A.P.S. (Pp. 276. 30s.) Philadelphia and London: Saunders. 1950.

Infrared Radiation Therapy Sources and their Analysis with Scanner. By L. Rovner. (Pp. 34. 11s.) Springfield, Illinois: Charles Thomas. Oxford: Blackwell Scientific Publications. 1950.

Massage reflektorischer Zonen im Bindegewebe. By H. Leube and E. Dicke. Introduction by W. Kohlrausch. 4th ed. (Pp. 83 M. 4.50.) Jena: Gustav Fischer. 1950.

Die Physiologie der Zeugung des Menschen. By H. Knaus. 3rd ed. (Pp. 485. M. 50.) Vienna: Wilhelm Maudrich. 1950.

Die Klinische Röntgendiagnostik der Inneren Erkrankungen. By H. Assmann. 6th ed. Parts 1 and 2. (Pp. 1,023. M. 59.60 and M. 75.60.) Berlin, Göttingen, and Heidelberg: Springer. 1949.

El Sexo a Voluntad. By R. A. Ascorti. (Pp. 54. No price.) Buenos Aires: El Ateneo. 1947.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY JULY 1 1950

INOCULATION AND POLIOMYELITIS

In this issue appear the two latest instalments in the curious story of the association between injection and the incidence in the inoculated limb of paralytic poliomyelitis. The recent Australian experience reported by McCloskey[1] has prompted the question, Can it happen here? Geffen[2] has already given an indication that, in the 1949 epidemic, cases of paralysis following inoculation have occurred in the London area. The possibility of such an association had already been pointed out by observers in this country. Both Ritchie Russell[3] and J. K. Martin[4] have described cases where injection of both prophylactic and therapeutic agents has been followed within a month by paralysis in the same limb. The diagnosis in these cases was made largely on clinical grounds, but Dr. MacCallum has now demonstrated, by monkey inoculation, the presence of the virus of poliomyelitis in the stools of children in whom the "double event" of inoculation and paralysis has been observed. The virus is widely distributed among the population, and this finding in itself does not prove that the virus discovered in stools is necessarily the cause of the paralysis. On the other hand, the survey made by Professor Bradford Hill and Dr. J. Knowelden, and described at page 1, adds fresh weight to the mounting evidence that the suggested association is not only a fact but also that it exists wherever poliomyelitis has assumed epidemic proportions in this country.

From 33 separate areas in England and Wales they have collected the records of 410 patients under 5 years of age suffering from poliomyelitis. They asked the medical officer of health of each area concerned to record the details of the date of onset and distribution of paralysis in these patients, and then a full history of inoculation from birth to the time of survey. They analysed the data to discover how frequently the site of paralysis coincided with the site of inoculation at different intervals after the date, or dates, of injection. In addition they used a neat form of control by selecting a "twin" for each of the poliomyelitis cases from among measles notifications made after the date of onset of the disease in the patients with poliomyelitis. The controls were paired with patients in respect of age and sex, and their inoculation histories were obtained in the same manner. When no suitable "twins" could be obtained from the measles registers, children having the same birthday and still living in the area were selected for comparison. It is clear from the tabulation of the data thus obtained that the distribution of the sites of paralysis in those inoculated within a month of the onset of their attack of poliomyelitis was unusual; not only were arms as frequently affected as legs, but the left arm (the usual site for inoculation in this country) was predominantly involved. Again it became evident that paralysis has followed the injection both of A.P.T. and of the combined A.P.T. and pertussis vaccine during this critical month preceding the onset of the disease. Pertussis vaccine alone was given so rarely that no sound deductions could be made about its ability to provoke paralysis. Within that critical month before the onset of poliomyelitis the distribution of the dates of inoculation accords reasonably well with McCloskey's findings in Australia. Most of the intervals between the date of the last inoculation and the recorded date of onset of symptoms were of 8 to 17 days—a lapse of time which corresponds with the incubation period of the disease.

This result may be compared with Ritchie Russell's observations on the effect of vigorous exercise in determining the severity of paralysis in poliomyelitis. He divides the clinical pattern of the disease into three stages: the prodromal stage of slight illness; this is followed after several days by the pre-paralytic stage of spinal involvement with pains in the trunk and limbs and general upset; the onset of paralysis marks the third stage in the development of the disease. But, he points out, many cases do not reach the final stage of paralysis. The effect of physical activity depends on the stage at which it took place, and Russell describes cases where arduous exercise in the prodromal stage has been followed within 24 hours by acute spinal symptoms and later by paralysis. In these cases an interval of 7 to 13 days elapsed between the date of exercise and the date of onset of paralysis. The analogy between the results of exercise in the effects of inoculation is in these circumstances quite striking.

This experience may be contrasted with the results of physical activity during the four days of the pre-paralytic stage, which has considerable influence on the degree of severity of the ensuing paralysis. In the series of cases described by Hill and Knowelden only one child had been inoculated less than a week before the onset of the disease. It may be that children with the general

[1] *Lancet*, 1950, **1**, 659.
[2] *Med. Offr*, 1950, **83**, 137.
[3] *British Medical Journal*, 1949, **1**, 465.
[4] *Arch. Dis. Childh.*, 1950, **25**, 1.
[5] *British Medical Journal*, 1950, **1**, 1489.

malaise of incipient poliomyelitis are not taken to the clinic for inoculation, but it seems more likely that the effect of injection is to produce paralytic symptoms in a patient who might otherwise have exhibited few if any signs and symptoms of poliomyelitis infection. A comparison of the inoculation histories in the poliomyelitis cases and those in the controls suggests that, since the frequency of inoculation is consistently equal at all intervals *beyond* one month from the date of onset in the paralysed cases, inoculation within that month must translate some children who are incubating the disease from the abortive to the pre-paralytic and paralytic stages of the illness.

It is now reasonably certain that inoculation, like tonsillectomy, may bring an added hazard to a child already infected with poliomyelitis virus. Unfortunately none of the surveys yet carried out gives any measure of the size of that risk or of the relative risks run by children of different ages or attached to different prophylactic agents. In this *Journal* last week[5] a correspondent expressed the anxieties of many parents who are trying to assess the dangers of their children contracting paralytic poliomyelitis if they are immunized against diphtheria and whooping-cough; as she points out, treatment of these diseases is now more effective than formerly. The fate of the immunization campaigns, which have been so brilliantly successful, may well be jeopardized by hasty speculation. To answer these questions with some feeling of conviction will require the conduct of extensive field surveys, which should not be long delayed. In the meantime it would seem best to take advantage of the seasonal incidence of poliomyelitis and restrict mass inoculation to the non-epidemic periods of the year.

PARALYSIS AGITANS

Paralysis agitans is not usually considered a heredofamilial disease, but Mjones,[1] who carried out an extensive survey in Sweden, has found evidence that this disease tends to occur in families. Patients in whom the diagnosis had been made in several Swedish clinics were examined in their homes by the author, and as many of their relatives, mainly siblings, as it was possible to interview were also examined and a thorough family history obtained. After the exclusion of cases of post-encephalitic Parkinsonism and patients who would not agree to examination, 250 cases were available for study. Of these, 32 were considered to be suffering from arteriosclerotic Parkinsonism. There was some difficulty about the differentiation of this from idiopathic paralysis agitans, but, in general, patients who had had acute cerebral episodes suggestive of a vascular accident, those with physical signs of pyramidal involvement, and those who developed an organic dementia in association with the progress of the extrapyramidal syndrome were included in this group. Another 24 patients were diagnosed as suffering from Parkinsonism rather than idiopathic paralysis agitans, since there was some reason to believe the condition was of an encephalitic origin. This group would seem to correspond with the type now commonly seen in this country—patients between the ages of 30 and 45 developing a Parkinsonian syndrome, often combined with difficulty in convergence of the eyes and sometimes pupillary changes, but without any history suggestive of an acute attack of lethargic encephalitis. These patients are usually regarded as sufferers from chronic epidemic encephalitis, but the name of "indeterminate Parkinsonism"[2] has also been given to them.

After excluding these two groups Mjones was left with 194 patients with idiopathic paralysis agitans, and among the relatives of 79 of them he found 162 secondary cases. In order to study hereditary influences more closely he then divided the patients into three groups. In the first, in which there were 46 original and 113 secondary cases, were families in which one of the patient's parents had also suffered from paralysis agitans. The second group consisted of families in which neither of the patient's parents suffered from the disease but some other relatives were affected; here there were 33 original cases and 49 secondary ones. In the third group were placed 115 patients with no secondary cases discovered among their relatives. These findings suggest strongly that there may be a familial tendency to paralysis agitans, but it is not clear from the author's monograph how far care was taken to exclude cases of heredo-familial (essential) tremor, one form of which may be a tremor of extrapyramidal type but without disturbance of muscle tone.[3] As Mjones states that in the secondary cases tremor was the symptom most commonly present, it is possible that cases of this benign disorder, which is well known to occur in families, may have been included and possibly invalidated the findings to some extent. Ten secondary cases of paralysis agitans were found among the relatives of the 32 patients with arteriosclerotic Parkinsonism, and from this the author suggests that Parkinsonian syndromes of varying nature may occur in families with a hereditary susceptibility of the extrapyramidal system, or that various hereditary forms of Parkinsonism can occur.

The drug treatment of the Parkinsonian syndrome has until recently been based on the use of the maximum tolerated dose of the solanaceous alkaloids—hyoscine, stramonium, and atropine. When given continuously in large enough doses they relieve rigidity and difficulty

[1] *Acta Psychiat., Kbh.*, 1949, Supplement 54.
[2] Dimsdale, H., *Quart. J. Med.*, 1946, **15**, 155.
[3] Critchley, M., *Brain*, 1949, **72**, 113.

in voluntary movement in many patients, but on the whole tremor is little influenced by them. Recently four new drugs have been used. "Parpanit," an antispasmodic related to "trasentin," was introduced in Switzerland,[4 5] where it was found to be of value in reducing the rigidity of Parkinsonism and the involuntary movements of athetosis. Schwab and Leigh[6] studied its effects carefully in 50 patients over a period of three months, and, basing their views largely on the patients' ability to carry out the ordinary "chores of life," they considered that parpanit was more efficacious than the solanaceous drugs in 62% of the cases, that it had an equal effect in 22%, and that in 16% the effect was not so good. Dunham and Edwards[7] confirmed the lessening of rigidity in patients on parpanit and considered that its activity was comparable to that of the solanaceous alkaloids, but some patients found its side-effects, of which the most prominent is a sensation of dizziness, less upsetting. "Diparcol," which is said to have a procaine-like effect on sympathetic ganglia, was first used in France by Sigwald and his colleagues,[8 9] who noted relief of Parkinsonian rigidity and lessening of tremor in over half of 168 patients. Some improvement in symptoms has also been reported by other observers,[10] but the side-effects of this drug are a disadvantage: they include severe vertigo, paraesthesiae in the legs, somnolence, transient paralysis lasting about an hour, and depression of the granular white blood cells. Ryan and Wood[11] found that the antihistamine drug "benadryl" improved rigidity, but not tremor, in 40 patients, but others have had less encouraging results with it. The latest newcomer is "artane" (trihexyphenidyl), with which Corbin[12] treated 104 patients: of 69 cases with idiopathic paralysis agitans 53 were benefited, and of 17 post-encephalitics 12 obtained some relief. The drug appeared to act by relaxing rigid muscles and in some cases tremor also was improved. The side-effects were usually slight, consisting of nausea, transient feelings of "lightheadedness," and occasional blurring of vision, but serious toxic effects, such as acute confusional states and extreme nervousness and agitation, occurred in four cases. Schwab and Tillmann[13] have treated 44 patients with artane for three months and found it improved the condition of 29, but in most of them it had its greatest effect when given in conjunction with parpanit, benadryl, or an atropine preparation. Though the drug relieved rigidity it did not lessen tremor, which in fact became worse in some patients. Farnell and McGavack[14] consider that the chief advantage of artane over other antispasmodics lies in the wider margin existing between effective and toxic doses.

The symptoms of the Parkinsonian syndrome may sometimes be more effectively relieved, and with fewer side-effects, by one or other of these new preparations than by the solanaceous alkaloids, but this can be discovered only by adequate trial on individual patients. It is very important that substitution should be carried out gradually, since sudden withdrawal of hyoscine or stramonium may increase rigidity and disability.

[4] Grunthal, E., *Schweiz. med. Wschr.*, 1946, **76**, 1286.
[5] Hartman, K., ibid., 1946, **76**, 1289.
[6] *J. Amer. med. Ass.*, 1949, **139**, 629.
[7] *Lancet*, 1948, **2**, 724.
[8] *Rev. neurol.*, 1946, **78**, 581.
[9] Ibid., 1947, **79**, 683.
[10] Duff, R. S., *British Medical Journal*, 1949, **1**, 613.
[11] *Lancet*, 1949, **1**, 258.
[12] *J. Amer. med. Ass.*, 1949, **141**, 377.
[13] *New Engl. J. Med.*, 1949, **241**, 483.
[14] *Amer. J. med. Sci.*, 1950, **218**, 655.

IMMUNITY TO DIPHTHERIA

Not the least service rendered by the Medical Research Council is the publication of Special Reports on investigations by individual experts or research teams. These familiar "green books" often deal with some topical problem and are notable for their detailed presentation and analysis, supported by a critical review of the relevant literature. The latest of these reports,[1] by Sir Percival Hartley and eight other workers from Tyneside and Dundee, who combined to study two unusual outbreaks of diphtheria in their respective areas, is no exception; the mass of data assembled is impressive and includes no fewer than 81 tables and several charts and diagrams. Perhaps the commendable attempt to explain, experimentally if possible, every unusual finding has led to some obscurity for the general reader, although it may satisfy the expert. The frank and full consideration of pros and cons may well invite opponents of inoculations to select only such statements as suit their beliefs.

While evidence from all over the world shows that active immunization is a powerful weapon in the control of diphtheria, occasional epidemics occur like those reported at Tyneside and Dundee in which some cases are found in inoculated persons. A disconcerting feature about the outbreaks under review was that 30–50% of the cases belonged to the inoculated groups. Hartley and his colleagues found that the majority of uninoculated persons who developed diphtheria had little or no circulating antitoxin. In the case of inoculated persons those who developed diphtheria had, on the whole, less antitoxin than those who did not. Although many cases were noted in inoculated persons with antitoxic levels which would normally be regarded as safe (more than 0.02 unit per ml.) their attacks tended to be less serious than those in the uninoculated. Moreover, the higher the circulating antitoxin, the milder was the disease as a rule, not a single death being reported at Dundee among the fully inoculated.

An interesting section of this report is concerned with the response to antigenic stimuli of different members of a community. Between 1940 and 1942 an immunization campaign had been conducted in Dundee, and some of the A.P.T. used was of poor quality. However, the evidence

[1] *Spec. Rep. Ser. med. Res. Coun., Lond.*, No. 272, "A Study of Diphtheria in Two Areas of Great Britain," by Percival Hartley, W. J. Tulloch, M. Anderson, W. A. Davidson, J. Grant, W. M. Jamieson, C. Neubauer, R. Norton, and G. H. Robertson. H.M. Stationery Office, 1950 (4s. net).
[2] Harms, A. J., *Biochem. J.*, 1948, **42**, 390.

suggested that a poor antigen was better than none. A.P.T. is to-day more uniform and satisfactory, when properly prepared and used, and the extreme variability of the prophylactics employed in the early years of the national immunization campaign in Great Britain is unlikely to recur. Great variations were recorded in the antitoxic responses of different persons injected with the same prophylactic. The immunizing mechanism of some of them was so sensitive that, even if the titre of antitoxin was low in the early stages of the attack, there was a rapid rise within a few days of onset to a level far higher than could have been attained by a therapeutic dose of serum. Most of these facts are in accordance with expectations. The evidence from the present study further suggests that in an inoculated community the persons most likely to fail to withstand attack are those who lag behind their fellows in the rapid production of antitoxin.

These studies stress again the need for maintaining as high a level of immunization as possible throughout the country—a primary course, followed by reinforcing doses, for at least 75% of the population has been suggested. Virulent forms of the gravis type of *C. diphtheriae* may break through the defences of inoculated subjects, but the disease is fortunately seldom severe and very seldom fatal. The point is made in the preface to this report that stocks of dry stable antitoxin and dry purified toxoid should be laid down for emergency use in the event of a sudden and widespread epidemic. It seems that there are already large amounts of enzyme-refined liquid antitoxin in cold storage in England, and this material may be expected to remain potent for many years.[2] Secondly, the available supplies of diphtheria prophylactics that are stable in the cold should be sufficient to meet any unusual demand.

The valuable guidance offered by this exhaustive report should be more accessible, and a consecutive digest of about 10 pages would be useful to all who are interested in the practical problems of diphtheria immunization. While the sectional summaries incorporate the main immunological findings, the authors would render a further service by publishing elsewhere an account of their conclusions.

PROGRESS IN ISOTOPE PRODUCTION

Progress in the production of radio-isotopes for therapeutic and research use was described during a press visit to the Atomic Energy Research Establishment, Harwell, last week. There had been a two-years interval since the only previous opportunity to view the work of the establishment. During the interval the large and elaborately equipped radiochemical laboratory had been completed, and this is now in regular use. Its most important work is research on the extraction of plutonium from uranium metal that has been irradiated in a pile, and some of the equipment was demonstrated which has been used for experimental extractions carried out on a laboratory scale. The chemical separation of radioactive isotopes for use in research is performed in another section of this laboratory, and many of the safety precautions which have been provided apply to both activities. In addition to the regular monitoring of radiation—that received both by the individual worker and at various points in the laboratory—there are such general facilities as the quick removal of air by exhaust ventilation; alarm bell installations; wash-basins which can be used without contact between the hands and the basin fittings; and provision for the rapid sluicing out of laboratory floors into special drainage tanks should this be required. All chemical operations involving high activities are carried out behind walls built of lead bricks, and a series of lead-lined storage cupboards is provided, graded according to the degree of protection necessary in the case of particular isotopes.

The section which separates isotopes for medical and research use is dealing weekly with 4-5 curies of radioactive material—the equivalent in activity, that is, of 4-5 g. of radium. Output of iodine^{131}, used mainly in treatment, is about 1.5 curies a week; that of phosphorus^{32}, used mainly in research, about 0.6 curies. Cobalt^{60}, therapeutically a substitute for radium, is being supplied to a number of Medical Research Council units. It is the isotope which most nearly mimics the gamma radiation of radium, and so was a first choice for such research. A more recent development has been the supply of iridium^{192} to the Department of Radiotherapeutics at Cambridge University for experimental investigation. It provides gamma radiation of rather lower energy (0.3 to 0.6 Mev) than that of cobalt^{60} (1.1 and 1.3 Mev) or radium, and from its physical properties offers the possibility of greater differential absorption as between tissues and bones. As an indication of overall progress in production it was stated that whereas 15 months ago some 150–200 consignments of radioactive material were being dispatched a month the present four weeks' total was about 550—of which 146 went in a recent month to other countries. The Harwell Establishment is now one of the principal suppliers of radio-isotopes on an international basis. The effluent from the establishment is controlled within tolerance limits prescribed by the Medical Research Council, and it is not envisaged that detectable biological effects would be produced in the Thames; the calculated activity due to effluent being, in fact, of the order of one-hundredth of that found under natural conditions in other rivers.

LOCAL CHEMOTHERAPY OF TUBERCULOSIS

It has been known for about ten years that 4-4′-diaminodiphenylsulphone—the parent substance of the sulphones "diasone," "promin," and "sulphetrone"—has a tuberculocidal action.[1] It was, however, rejected for clinical use because of its toxicity, and a search was made for active but less toxic derivatives. This resulted in the discovery of promin, diasone, promizole, and sulphetrone, all of which have been used in the treatment of tuberculosis. Although less toxic than diaminodiphenylsulphone, they are much less active. Many reports on their use in the treatment of tuberculosis have already been published, and it is apparent that they are all inferior to streptomycin. It should be noted, however, that diasone and streptomycin are more effective than streptomycin alone in the treatment of tuberculosis in the guinea-pig,[2] and it may be that the

[1] Rist, N., *C.R. Soc. Biol., Paris*, 1939, **130**, 976.
[2] Smith, M. I., McClosky, W. T., Jackson, E. L., and Bauer, H., *Proc. Soc. exp. Biol., N.Y.*, 1947, **64**, 261.
[3] *Schweiz. med. Wschr.*, 1948, **78**, 224.
[4] *Leprosy Rev.*, 1949, **20**, 4.
[5] *Lancet*, 1950, **1**, 145.

activity of streptomycin in human tuberculosis is enhanced by diaminodiphenylsulphone. Few papers have so far been written about the local use of diaminodiphenylsulphone in human tuberculosis: though believed to be too toxic for oral or parenteral use the careful local application to tuberculous lesions does not carry great risks, since a blood concentration of 0.5 mg. to 2 mg. per 100 ml. can be tolerated. Rist and his colleagues[3] at Leysin in Switzerland have reported a study of twenty-four cases of tuberculosis treated locally with diaminodiphenylsulphone. The results were regarded as excellent. All the patients had previously been under treatment and were making no progress. Improvement began in two to four weeks, though clinical arrest of the disease took about four months. Diaminodiphenylsulphone was dusted twice a day on ulcerative lesions or injected as a suspension in saline (30 to 60 mg. per ml.) into tuberculous sinuses or cavities. In the case of buccal or laryngeal lesions the powder was applied several times a day. The patients were also treated by rest, heliotherapy, and, in some cases, surgical drainage.

Although the amount of drug absorbed varied with the site of application and method of use, signs of intoxication did not appear provided the amount of drug absorbed did not exceed 120 mg. daily. The conditions treated included tuberculous ulcers of the skin, mouth, tongue, and larynx; tuberculous arthritis; tuberculous fistulae; and tuberculous pleurisy, which was treated by the intrapleural injection of 200–300 mg. of diaminodiphenylsulphone suspended in 40 ml. of warm saline. Treatment was continued in many cases for as long as sixteen weeks without serious ill-effects. Signs of haemolytic anaemia appeared after three to four weeks, but this is common during sulphone therapy and is amenable to treatment with haematinics such as iron, liver, and yeast. Cochrane and his colleagues[4] have recently reported that the subcutaneous administration of diaminodiphenylsulphone results in fairly rapid clinical and bacteriological improvement in leprosy, the causative organism of which is also an acid-fast bacillus. In Cochrane's patients also no serious toxic effects were observed, though he admits that the drug must be administered with caution. Confirmation that diaminodiphenylsulphone may be less toxic than was at first believed has also come from Lowe,[5] who has reported that the drug can safely be given by mouth if the dose is gradually worked up from 100 mg. to 300 mg. per day.

BACTERIAL POLYSACCHARIDES FOR CANCER

A news release earlier this year by the American Cancer Society about the treatment of malignant disease with bacterial polysaccharides was apparently exaggerated in the press of the U.S.A.: some reference to it was also made in papers in this country. The work concerned is very far from being new: indeed, its origins may be said to go back about 50 years to the use of Coley's fluid. A stage in its modern development was the study by Shwartzman[1] of the phenomenon now known by his name, one manifestation of which was found to be haemorrhagic necrosis in and around certain malignant tumours in mice when filtrates of cultures of meningococci or typhoid bacilli were injected intravenously. The present stage of the work was begun in 1943 by M. J. Shear, of the National Cancer Institute, who extracted a substance having this effect on tumours from *Chr. prodigiosum* (in America *Serratia marcescens*), one of the organisms of which the original Coley's fluid was a suspension. This substance is a polysaccharide, and when administered to mice bearing certain transplantable sarcomas will actually cause disappearance of the growth, without subsequent recurrence, in a fair proportion of animals, but only when given in a dose itself responsible for a mortality of about 30%. In the clinical trials which have now followed, a more cautious dosage system has naturally been necessary. According to Reimann and Nishimura[2] the initial dose given intravenously or intramuscularly is 20 μg., and this causes high fever and repeated severe rigors. Up to four additional increasing doses are given at intervals of two days. It is not claimed that any case of malignant disease has been cured, but varying degrees of regression have resulted, tumours becoming smaller and more mobile. It seems that the haemorrhage which occurs may detach them from surrounding tissues and so simplify operative removal when this was previously not feasible. Sarcoma responds best, but it is claimed that the extract has some effect on carcinoma: melanoma is the only type of growth found quite refractory.

The two main difficulties in this treatment are that the theoretically effective dose carries too high a risk of fatality and that, the substance being antigenic, immunity is rapidly developed with consequent loss of action. Attempts are being made by Creech and his colleagues in Philadelphia to reduce these difficulties by a more penetrating study of the reagent used and the response to it. The polysaccharides obtained from different strains of the organism have been found to be serologically distinct and could be broken down into fractions having different properties.[3] Protection can be afforded against the lethal effect by an immune serum, and it seems that the lethal and tumour-necrotizing actions are to some extent distinct,[4] which suggests the possibility of administering a larger dose with safety. Of the various lines of progress in the chemotherapy of cancer this is perhaps not the most promising, but it has this to commend it: that, whereas teropterin and nitrogen mustard are pure chemical compounds, the bacterial extracts concerned here are by no means pure, and separation of their constituents might possibly yield something of greater value and more certain effect. It is evidently on these lines that work at Philadelphia is proceeding.

Professor E. C. Dodds, M.V.O., M.D., F.R.C.P., F.R.S., will deliver the Bertram Louis Abrahams Lecture before the Royal College of Physicians of London, Pall Mall East, S.W., on Thursday, July 13, at 5 p.m. His subject is "The Bearing of Protein Structure on Clinical Problems."

Professor A. Bradford Hill, professor of medical statistics in the School of Hygiene and Tropical Medicine, has been elected President of the Royal Statistical Society.

---

1 *The Phenomenon of Local Tissue Reactivity*, 1937, London.
2 *J. Mich. med. Soc.*, 1949, **48**, 453.
3 *Cancer Res.*, 1948, **8**, 318.
4 Ibid., 1949, **9**, 589.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

CARDIAC NEUROSES

BY

PAUL WOOD, O.B.E., M.D., F.R.C.P.

Physician, Postgraduate Medical School of London; Physician, National Heart Hospital, etc.

Despite determined attempts to separate cardiac neurosis from Da Costa's syndrome there is no clearly defined difference between them, and the slender distinctions that can be made are academic rather than practical. The syndrome consists of a group of symptoms and signs referable to functional disturbance of the autonomic nervous system and related primarily to anxiety.

History

The first classical description came from Da Costa in 1871, based on his experience in the American Civil War. A year later Charles Darwin (1872), who suffered greatly from the condition, described the symptoms with extreme clarity. It is odd that these works were not correlated at the time. The first attempt to investigate the problem scientifically was made by Lewis (1917) at Hampstead, and later at Colchester. His chief contribution was to prove that the disturbance was functional, and that it did not depend upon organic disease of the heart. He discarded the terms "D.A.H." and "soldier's heart," and coined the phrase "effort syndrome," believing that the signs and symptoms were identical with those produced on effort by a normal individual.

It fell to the Mill Hill team in 1941 to show that over 90% if not all of these cases were psychiatric (Wood, 1941a, 1941b). In a note on nomenclature it was suggested that the disorder might with advantage be called Da Costa's syndrome, for disturbances of the heart and circulation deserved no special emphasis in a condition in which the respiratory, somatic, visceral, and sudomotor systems were equally involved; moreover, the term had the merit of heading the syndrome into a historical cul-de-sac, for it was believed that the physical approach was wrong, and that a proper psychiatric diagnosis could invariably be made, commonly but not necessarily an anxiety state. Lewis's view that the symptoms were identical with those produced in a normal person on strenuous effort was disproved.

Aetiology

It should be clearly understood that cardiac neurosis is not an imaginary disorder; on the contrary, sufferers from so chronic and incapacitating a malady are often to be pitied more than those with organic heart disease. The aetiology is always psychiatric: it is commonly an anxiety state, usually associated with reactive depression and not infrequently with hysterical features; occasionally it is part of a hypochondriasis; rarely it is the physical manifestation of a psychosis.

A history of neurosis in one or other parent is obtained in over half of the cases, and at least two-thirds exhibit neurotic traits in childhood. The most constant characteristic is timidity, which results in lack of confidence, a sense of inferiority, and undue apprehension. On such soil an anxiety state takes root very easily. It is customary to blame adverse environmental factors, but in my opinion hereditary predisposition is much more important; the personality tends to disintegrate in circumstances that are not beyond the range of common experience.

Precipitating factors are usually multiple and are closely linked with fear. In childhood this is often fear of football or swimming; fear of battle in wartime requires no emphasis, but the minor pinpricks of Army life, away from the security of home, are almost as frequently responsible. In civil life it may be fear of being unsuccessful, of being proved inadequate, of being a failure; social difficulties may precipitate a breakdown, but sex problems seem to play a relatively minor part. As previously stated, the final provocative agent is relatively unimportant, though it may loom large in the patient's history.

Palpitations and left inframammary pain may suggest the idea of heart trouble to the patient, and in the past this has been all too often confirmed by the practitioner, who mistakes tachycardia, overaction of the heart, and a systolic murmur for evidence of heart disease. This misconception at once closes a vicious circle, for the patient then develops a fear of sudden death, which enhances his anxiety and so increases his symptoms. In the process of time autonomic reactions to a variety of stimuli that probe the weakness in the patient's character become ingrained as conditioned reflexes and may become divorced from emotional tone. Pernicious grooves of this kind are extremely difficult to eradicate.

Finally, there is a group of cases in which the syndrome is perpetuated by a motive for gain. This is best illustrated in compensation neurosis, and during the war it was obvious at every medical board. To men of this kind sickness offers security and protection.

Incidence

Approximately one in three or one in four patients who present themselves at cardiovascular clinics are suffering from psychoneurosis without organic disease of the heart. The ratio of males to females is 2:3. Although commonly a disorder of young adults and women at the menopause, it is by no means infrequent in children and in elderly subjects of both sexes.

In the 1914–18 war there were some 60,000 casualties from effort syndrome in the British Forces; in the 1939–45 war there were remarkably few so labelled, owing to the enlightened attitude of medical officers; on the other hand, there may have been more recognized psychiatric cases.

Clinical Features

The chief symptoms include breathlessness, palpitations, fatigue, left inframammary pain, dizziness, undue sweating, and headache.

Breathlessness is not limited to effort. Patients usually complain that they are unable to obtain a satisfying breath —hence the frequent deep sighs. Breathing is apt to be hurried, irregular, and shallow. As a rule the breath cannot be held for 20 seconds, yet when the breaking point is reached there may be no dyspnoea. Again, if the patient is asked to overbreathe for a minute, subsequent dyspnoea often replaces the normal period of apnoea and must

depend upon a hysterical mechanism. Associated dizziness and tingling of the fingers during the test prove genuine hyperventilation.

Palpitations differ in no way from those produced in normal subjects in moments of fear or after an injection of adrenaline. During an attack the cardiac output is raised, the systolic blood pressure is elevated, and the heart beats more quickly and more strongly. The stimulation is central and there is no hypersensitivity to adrenergic substances.

Fatigue, perhaps the commonest symptom in psychoneurotic patients in civil life, may be attributed to emotional conflict. The mechanism is not clearly understood.

Left inframammary pain plays an important part in the development of cardiac neurosis by suggesting heart disease. The pain is usually described as a dull ache with intermittent sharp jabs; the dull ache may last for hours or days at a time, but the jabs are always momentary. Although commonly situated in the left inframammary region, the pain may be nearer the sternum, further out in the axilla, or subclavicular; sometimes it is also felt at the angle of the left scapula, and in about 25% of cases it also occurs on the right side. Radiation down the left arm is common. Pain is aggravated by lying on the left side and is often provoked by fatigue; although it may occur during effort it is more usual afterwards.

Psychosomatic pain should be a positive diagnosis, not one to be arrived at by a process of exclusion. The qualities described are remarkably constant and there are rarely grounds for confusing the pain with angina pectoris. The mechanism of its production is by no means clear, but it arises in the soft tissues between the superficial and deep intercostal fascia at the site where it is felt; it is not referred. Injections of procaine hydrochloride or saline into this tissue relieve the pain at once, but no relief is afforded by cutaneous, subcutaneous, or pleural injections. The pain is certainly not imaginary, but it may be exaggerated and perpetuated by the belief that it arises in the heart.

Vasomotor syncope occurs in about one-third of the cases, but attacks of momentary dizziness are very common. The latter is a frequent complaint in middle-aged men, and even now in civil life is often attributed to some disorder of the heart. Little will have been gained if practitioners who have been taught to recognize the innocence of palpitations and left inframammary pain transfer the anxiety to dizziness.

Undue *sweating* occurs characteristically on the palms of the hands and in the axillae—the chief emotional sweat areas. The cold clammy hand of the psychoneurotic is well known, and at once distinguishes these cases from thyrotoxicosis.

Headache may be vague or throbbing. The former may well be hysterical, but the latter presents all the criteria of a vascular headache and is promptly relieved on the homolateral side by compression of one or other carotid artery.

Physical Signs

Nearly all patients suffering from an anxiety state present a number of characteristic signs upon which a positive diagnosis may be made. The most important of these may be listed as follows: (1) nervousness, depression, or anxious speech or behaviour; (2) tremor or shakiness; (3) frequent deep sighs or hyperventilation; (4) clammy cold hands; (5) tachycardia (except when asleep); (6) raised casual blood pressure in the region of 160/90; and (7) inability to hold the breath for longer than 20 seconds and post-hyperventilation dyspnoea.

Treatment

It is well to remember that the majority of anxiety states run a chronic or recurrent course throughout life, and it is doubtful whether more than one-third make a complete and lasting recovery. Nevertheless, physical incapacity may be relieved in most cases seen in civil life.

The first step is to reassure the patient unconditionally that his heart is strong and healthy and is not responsible for pain, breathlessness, or dizziness, and that palpitations merely denote a good heart responding to conscious or subconscious emotional stimulation. His fear of sudden death must be relieved; this at once breaks one of the vicious circles. Many patients resist the idea that their hearts are normal and are unlikely to accept such an opinion unless it is based on a full physical examination, preferably supported by radiograph and electrocardiogram. Such tests should not be regarded as a waste of time and energy because the history clearly denotes a chronic anxiety state. It is not difficult to convince a patient that strong emotion, especially fear, causes hurried breathing, palpitations, tremor, and sweating of the palms; it is but a step to explain that continued anxiety acting over a long period of time may have a similar effect. Left inframammary pain is less easily explained, but it may be attributed to undue muscle tension and faulty posture without deviating too far from the truth. Many patients with Da Costa's syndrome have similar pains elsewhere, particularly low back pain. They readily appreciate that there is little difference between the two except the site of origin.

Most patients are prepared to recognize that they have an anxiety state when they are told firmly that there can be no other cause for their condition, and when they feel that by such an admission they will not forfeit the sympathy of the doctor. The various steps that have led to the final breakdown should then be traced, including parental and constitutional factors. The more obvious and immediate provocative agents are rarely important aetiologically, certainly not those difficulties that the patient recites with gusto. It is always necessary to probe deeper and to be content with nothing that does not excite a strong emotional reaction. The exposure of real anxieties nearly always results in tears—in both sexes. Psychiatrists usually know when they are approaching important psychological difficulties by meeting what they call resistance, the patient trying to evade the issue or becoming silent and diffident.

Another useful axiom is that anxiety states rarely develop without a multiplicity of causes. In a busy practice it may seem impossible to spare the necessary time to discover them, yet in the long run it is economical; certainly it is better to spend an hour or two making a proper initial diagnosis than to waste a few minutes each week over the years looking after someone who is believed to have a "tired heart."

To give a patient insight into the cause of his condition, however, does not necessarily improve his symptoms, but it does allow him to appreciate their innocence and so prevents physical incapacity. As a rule, too, the frank discussion of his difficulties brings a measure of psychological relief. Every effort should be made to cure obvious predisposing factors. With the help of sound advice such patients should be able to resolve their difficulties, though they may require courage to take the necessary steps. In the simpler cases a month's rest and relaxation may be of great benefit.

The group with strong evidence of predisposition is more difficult to treat successfully. As previously stated, the factors that have precipitated the breakdown in these cases are hardly beyond the run of common experience, and

similar difficulties are bound to be encountered again. Therefore, little is gained by psychotherapy, the patient's character being virtually unchangeable. Nevertheless, it should be possible to prevent physical incapacity even in this type.

Although a good physician should be able to deal with most cases of "cardiac neurosis," he should not hesitate to enlist the help of a psychiatrist if he can make no headway.

REFERENCES

Da Costa, J. M. (1871). *Amer. J. med. Sci.*, **61**, 17.
Darwin, C. (1872). *The Expression of the Emotions in Man and Animals*. Murray, London.
Lewis, T. (1917). *Med. Res. Comm. Spec. Rep. Ser.*, No. 8. London.
Wood, P. (1941a). *Proc. R. Soc. Med.*, **34**, 543.
—— (1941b). *British Medical Journal*, **1**, 767, 805, 845.

EDUCATION OF THE PUBLIC CONCERNING CANCER

BY

MALCOLM DONALDSON, F.R.C.S., F.R.C.O.G.

Consulting Physician-Accoucheur, late Director, Cancer Department, St. Bartholomew's Hospital; Gynaecologist, Mount Vernon Hospital, Northwood

There is one fact in connexion with cancer that has been proved beyond any doubt: in certain sites it is curable in a high percentage of cases, if diagnosed and treated early. It is also beyond dispute that in the majority of patients who come to be treated the disease has already reached an advanced stage. There are many reasons for this, and a considerable difference of opinion exists on which of them is chiefly responsible. Some practitioners consider the chief cause is that the symptoms of malignant disease in many sites are insidious in their onset; they resemble those of trivial complaints, and the patient is almost unaware that anything is wrong until the disease is widespread. This is true of cancer of the lung, cancer of the ascending colon, and cancer of the stomach, but not (as a rule) of skin cancer, breast cancer, and uterine cancer. Some people blame the general practitioner—often unfairly—for not diagnosing the disease and sending the patient to hospital while it is still curable. Others think there is considerable evidence that the blame rests with the patient, who is too ignorant or too fearful to report to the doctor when the symptoms are first noticed. Let us consider these possible causes in turn, and discuss remedies.

Insidious Onset of the Disease

In theory, the only way to remedy this cause of late diagnosis would be to carry out a complete overhaul of every member of the population once or twice a year. This is absurd; even if it were possible, many cases would be missed. "Tumour clinics" have been established in some countries, notably America; although a number of unsuspected cases have come to light the number is not sufficient, in the opinion of many people, to justify the employment of so many specialists. It may be argued, however, that such clinics give mental relief to people who have a hidden dread of the disease and do not wish to visit their own general practitioner for fear of being considered neurotic.

The General Practitioner

In some cases the G.P. does miss an obvious case of malignant disease, but it is easy to make excuses for such mistakes. The first of these is overwork. How can a general practitioner afford fifteen or twenty minutes to take an accurate history and examine, for example, a patient aged about 45 who complains of irregular bleeding? It is much easier to prescribe some ergot and tell her it is probably the "change of life" and to return if the condition is not improved. Again, it must be realized that the number of cancer patients seen by any one general practitioner in a year is small, though the aggregate is probably over 100,000. It is also true that most of the patients first present themselves with the disease far advanced; the practitioner takes a pessimistic view, and possibly does not bother to look out for early cases.

Is there any method of remedying this cause? Yes. A certain amount can be done to help the practitioners by lectures in the cancer centres, to remind them of the early signs and symptoms and to point out that the outlook is not so hopeless if the case is diagnosed and treated while the disease is still localized. One cancer organization in this country has already started work on these lines.

Ignorance and Fear of the Public

In my opinion this is the greatest difficulty in the way of early diagnosis, and this view is backed up by a recent survey of cancer patients in the London area. The figures from this survey showed that over 55% of patients suffering from cancer of the breast waited for more than three months after noticing a lump before consulting a doctor, and over 16% waited longer than a year. Roughly the same figures are given by a study of patients suffering from cancer of the uterus who had disregarded "irregular bleeding."

It is not suggested that all these patients lost their lives as a result of the delay, nor that all those who died would have been saved. Nevertheless, if the well-established survival rates of patients treated in the early stages are applied to the patients who died, it is more than probable that over 2,000 women every year would be saved from death due to cancer in these two sites alone.

Knowledge the Antidote to Fear

Can these great contributing causes to the high mortality of cancer—fear and ignorance—be overcome by an educational campaign among the public? Many people think it is quite impossible; but, as Nansen said, "Things which are difficult to do take a long time, and those which are impossible take longer." Others think that the only result of such an effort would be to increase fear of the disease and create a population of neurotics. If this were correct it would indeed be terrible, for it is better to die of cancer than to live in constant dread of it. But it would not be true if the campaign of education were carried out in the right way. There are at the present time many people who are suffering from cancer phobia, and who are very difficult to convince that they have not got the disease, but there are thousands who are apprehensive because of ignorance.

There are over 73,000 deaths each year from cancer, and nearly every one of those patients die in their own homes and are looked after by their own relatives; it is therefore a conservative estimate that over 200,000 people each year come in contact with the disease under the most distressing circumstances. In the course of years, the number who undergo this experience is very great. Is it to be wondered that there are many thousands of people who suffer apprehension over a disease about which they know nothing and are told nothing? To misquote, "this ignorance doth make cowards of us all."

Another argument sometimes used against such a campaign is that patients will crowd out the surgeries. This

is not true if the education is carried out correctly. No general practitioner can doubt that the majority of the so-called neurotics who "live on his doorstep" do so in the hope that they may be told they have *not* got cancer, but are too frightened to mention the word.

Cancer education is being carried out in many countries, and the Americans have done so on a very large scale; but what is the right method in one country will certainly not suit another. In Britain it is a statutory obligation on the part of the local authorities to carry out all health education. It is to be hoped that in the near future the local authorities will undertake this education in connexion with cancer, as with our present knowledge it is the only hope of making earlier diagnosis and lowering the appalling mortality of this disease. Meanwhile, it would seem a wise step to try out a pilot scheme in an area with a population of four or five million people. Such a scheme might be carried out in more than one area, with different methods. It should not take more than one or two years to obtain the results of such an experiment.

GENETICAL STRUCTURE OF POPULATIONS

GALTON LECTURE BY PROFESSOR SEWALL WRIGHT

The Galton Lecture was delivered at University College, London, on June 14 by Professor SEWALL WRIGHT, for many years professor of zoology at the University of Chicago and at present visiting the University of Edinburgh. The subject of a highly recondite lecture in which mathematical symbols figured largely was "The Genetical Structure of Populations." Professor L. S. PENROSE presided.

Professor SEWALL WRIGHT began by remarking that Mendel's genetical approach and Galton's statistical one were complementary. Gene frequencies, and hence genetic variability, tended to remain unchanged in a large random-breeding population in which structure in the strict sense of the word was absent. In such a population they remained unchanged for generation after generation because of the persistence of genes and the symmetry of the Mendelian mechanism. This contrasted with the expected halving of variability in each generation, under blending heredity, which Darwin and his contemporaries recognized to be the greatest difficulty in the theory of natural selection. This principle was first expressed in general form in 1908 in independent papers by Hardy and Weinberg. In the same year another deduction from Mendelian principles—namely, that self-fertilization should result in random fixation of half the heterozygous loci in each generation—was used by Shull to interpret the loss of vigour and the fixation of diverse combinations of quantitatively varying characters which he found in his experiments on maize.

The statistical properties of a population would alter with changes in zygotic composition even though gene frequencies were not altered. Professor Wright expounded the mathematical basis of this, and said that the decrease in size, fecundity, and viability usually observed on inbreeding seemed to arise from an association of recessiveness with deleterious effect.

A discussion of the structure of natural populations required the simultaneous consideration of all the processes by which gene frequencies might change. There were, first, those which tended to bring about directed changes according to some definite function of the gene frequencies, such as recurrent mutation, immigration, and selection. Then there were fluctuations which were indeterminate in direction but determinate in variance. And, yet again, there were changes in gene frequency which were best treated as indeterminate in both mean and variance, such as mutations which occurred very rarely in the history of a species, and, similarly, rare hybridization, unique selective incidents, and the like.

After discussing the island model of structure and isolation by distance, Professor Wright devoted the second and perhaps more generally interesting part of his lecture to evolution and the significance of population structure therein.

Population Structure in Evolution

A distinction must be made, said the lecturer, between two aspects of population structure in evolution—namely, multiplication of species and transformation. Partial isolation obviously tended towards the splitting off of a new species if the environmental conditions were widely different. The best-adapted form in a species was usually one which was close to the average in all quantitatively varying characters. There were certain to be in any population a great many groups of individuals similar in genetic constitution that were approximately of this optimal type. In a population in which there was indiscriminate breeding one of these groups (genotypes) inevitably took a lead over the others and tended to become fixed. On the other hand, in a subdivided population in which isolation and cross-communication were balanced local fluctuations in conditions which shifted slightly the position of the optimum ensured the predominance of different genotypes of essentially the same type-group in different places. This might be brought about in sufficiently small local populations by the accumulation of sampling accidents without any fluctuations in conditions.

The kaleidoscopic shiftings in the sets of gene frequencies of neighbourhoods might be expected to lead occasionally to a predominance of combinations with selective advantages under the prevailing conditions far in excess of what was indicated by the sum of the net effects of the components. Control by selection thereupon superseded control by stochastic processes and immigration. Thus in a subdivided population as opposed to an indiscriminately bred one, favourable combinations might spread through the species by a selective process which operated on the whole instead of merely on the separate net effects of the components.

Any number of genes might contribute to a favourable new combination. Some might play an essential part and others that of minor modifiers. An important case was that of a single major mutation combined with an array of modifiers which brought its effects into harmonious adjustment with other characters. In a finely subdivided population there was a good chance that somewhere, at some time, a combination of modifiers would be encountered giving sufficient adjustment to reverse the direction of selection locally and thus create a centre from which the system of homoeotic mutations and modifiers could spread as a unit throughout the species.

Most species, said the lecturer in conclusion, were held to such restricted niches in their natural history by the pressure of other species that only an increase in specialization for the particular niche was probable even with the most favourable population structure. If, however, a more extensive oecological opportunity was ever presented, the finely divided population structure was most favourable for its rapid exploitation. Such an opportunity arose when migrants reached a territory where there were many unoccupied niches in which they could live. It arose also when a permanent change in conditions eliminated many species but left the relatively preadapted survivors to take over the vacant niches. Most important of all, perhaps, were the occasional cases in which a specialization turned out to be usable in a hitherto unoccupied way of life or to give a general advantage in many ways of life. The origin of the higher categories seemed to have its basis in such oecological opportunities.

Organic evolution was not the only sort of evolution in the sense of a process of cumulative change. When a level of intelligence was reached in an anthropoid line that made symbolic speech possible, a new evolutionary process emerged enormously more rapid than organic evolution. The line of persistence and accumulation was that from speaker to listener, and later from writer to reader, instead of the germ line. The principles of Mendelian heredity did not apply to the evolution of culture. Nevertheless, the general qualitative conclusion still seemed to hold—that this or any other evolutionary process depended on a continually shifting but a never obliterated state of balance between factors of persistence and of change, and that the most favourable condition for this occurred when there was a finely divided structure in which isolation and cross-communication were kept in proper balance.

FIG. 1.—Composite photograph and drawing showing the present College and the Nuffield College of Surgical Sciences.

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND

ONE HUNDRED AND FIFTIETH ANNIVERSARY

BY

W. R. LeFANU, M.A.
Librarian of the College

The Royal College of Surgeons looks back with pride over 150 years of service to the science and art of surgery, while it looks forward with new vigour to fresh and wider enterprise, on which it has already embarked. The College was disastrously damaged by the war, but, thanks to the energy of the immediate past president, Lord Webb-Johnson, plans for rebuilding and extension have been prepared and the restoration fund has already attracted a high proportion of the amount invited, in donations from all over the world which range from those of humble affection to others of princely munificence. In addition, during his presidency the scientific departments of the College have been very richly endowed by the late Sir William Henry Collins, and soon the new Nuffield College of Surgical Sciences, a residential college for a hundred postgraduate students, will rise beside the restored College. Without waiting for the possibility of rebuilding and expanding, the newly assumed duties of organized post-graduate teaching and of promoting collegiate life among students, Members, and Fellows have been put actively in hand. The College has drawn to itself, too, the kindred professions of anaesthetics and dental surgery, formed into special Faculties within it.

The Royal Charter

A hundred and fifty years ago the Company of Surgeons of London had been wound up after irregularities in the conduct of its business. The reforming spirits among the London hospital surgeons reincorporated themselves not as a City company but under royal charter as the Royal College of Surgeons in London, and proceeded to assume the duties and functions of the old Company. Thus the College has direct continuity with its predecessors and inherited its records, its plate and possessions, and its newly acquired house in Lincoln's Inn Fields. The Company's Library, formed at the instigation of John Hunter, had been dispersed, and Hunter's own museum, entrusted to the Company by Parliament in 1799, had not yet been taken over.

The prime duty inherited by the College was that of granting qualification to practise, and the Court of Examiners, which to-day has under its control admission to the most coveted surgical degree in the Commonwealth, if not in the world, is the direct successor of the Court appointed in 1800. At first the College was chiefly concerned with the qualification of surgeons for London and for the armed Forces. Gradually the possession of a Member's Diploma was recognized throughout the country as a necessary hallmark of surgical proficiency, and it became clear to the more far-seeing that a higher surgical degree was called for to establish a standard of special attainment. Benjamin Brodie successfully instituted the new order of Fellows of the College in 1843. Examination for the Fellowship became the most important duty of the College, and the requirements for it and their correlation with those of kindred bodies have been frequently reviewed and reformed. Originally the Council of the College was a self-perpetuating body with life tenure, but by the new charter of 1843 it was opened to all Fellows, appointment being through election by the whole body of Fellows for a fixed term. The national status of the College was emphasized at the same time by substituting "England" for "London" in its title. In very recent years the Council has further widened its character by co-opting members to represent the related specialties and general practice. Specialist diplomas have been granted jointly with the Royal College of Physicians for more than 60 years, and it is 90 years since the College established its Licence in Dental Surgery. Since 1947 it has granted a Fellowship in Dental Surgery, and since 1948 a Fellowship of the Faculty of Anaesthetists.

The Influence of Hunter

The conditions of the Hunterian Trust include the delivery of lectures in comparative anatomy and surgery, and in 1810 the first lectures were given by Everard Home and William Blizard. By this time the successors of Hunter, men who had learned directly from him, were assuming control of College affairs. Thenceforward the lectures have been continued, and appointment to a Hunterian professorship is still eagerly sought by younger surgeons as a recognition of their scientific achievement

FIG. 2.—Drawing of Dance's building by T. H. Shepherd, 1828.

and by established men to demonstrate their latest advances. The Arris and Gale anatomy lectures, whose endowments date from the seventeenth century, were revived, and in the course of years the College has established other lectureships, all intended for postgraduate instruction. They

FIG. 3.—Barry's Building, 1838. From an engraving by W. O. Celler.

have long been an attraction of the surgical year; and certain College lectures delivered by visiting American surgeons a few years ago drew audiences which doubly overflowed the lecture theatre. A Hunterian lecture by a past president of the American College of Surgeons, Dr. A. W. Allen, has been a prominent feature of the 150th anniversary celebrations. Since the war the College has also established integrated courses of practical postgraduate instruction, for admission to which competition is keen. Several prizes are in the College's gift, the one held in most honour being the famous Jacksonian.

With the rise of Hunter's pupils to control the College a great impetus was given to productive work. In 1813 the first specially built College House went up, but it was entirely rebuilt twenty-five years later to accommodate the growing Museum and Library. The great cost of the museum buildings was borne very largely out of College funds. The care of the museum was in the hands of Hunter's last and most loyal assistant, William Clift, the living transmitter of the Hunterian tradition. Clift was conservator from 1800 to 1842; he was no mean anatomist and artist, and achieved election into the Royal Society. But he was, in Keith's phrase, "a meticulous gatherer of small facts," not a man of organizing power. In the late eighteen-twenties the presidential chair was held in succession by John Abernethy, Astley Cooper, and Anthony Carlisle, who realized that the Council was legislating in the void without officers of capacity to carry through its decisions.

Richard Owen, a young Member of the College, was appointed by Abernethy in 1826 to assist Clift, and quickly assumed direction of the museum; he married Clift's daughter, and succeeded him as Conservator in 1842. Under Anthony Carlisle, who was himself a bibliophile and a benefactor of the library, Robert Willis, M.D., the outstanding English medical scholar of the day, was appointed librarian. Willis laid down the lines and formed the basic collections from which the library has developed; he made it a working scientific library for the museum staff, open like the museum to bona-fide scientists and advanced students, and a repository of historical surgical literature. Reorganized in the 'eighties, it was then the best medical library in the country; but the growth of many other libraries has enforced the need for its specialization, and to-day it takes a prominent place as the surgical library among the interrelated special libraries of medicine.

Richard Owen's Work

Owen was a man of genius. In the first years of his assistantship masterly catalogues of the Hunterian collection and its accretions began to appear, and he was all the time examining and making known specimens which Hunter had put up but left unrecorded. Throughout these years he was himself making a vast series of studies of the finest quality in comparative anatomy and palaeontology. It is to Owen more than any other that the scientific prestige of the College is due. Owen's courses of Hunterian lectures extended from 1837 to 1856, and are recorded in his writings, such as the unsurpassed *Odontography*. He was succeeded as Hunterian professor by no less a man than T. H. Huxley, the champion of Darwinism, who was (it is sometimes forgotten) a surgeon and a Fellow of the College.

What bearing, it may be asked, had Owen's work on the progress of surgery? Had he, as the scientific spokesman of the College, any influence on the major developments of surgery which were the glory of the nineteenth century? Directly, he had none; but indirectly his influence was all-pervading. Owen put into general circulation that knowledge of all natural form and function which Hunter had seen to be the essential groundwork for a true comprehension of the structure and function of the body of a man. In Owen's early years at the College, the Council, and in particular Astley Cooper, had been deeply concerned about the training of teachers of anatomy. Owen set a standard of achievement in anatomical research and teaching which has not since been equalled. He made the museum a storehouse of material for the solution of fundamental anatomical problems, unique in the world in its size

FIG. 4.—The Royal College of Surgeons Museum as it appeared in May, 1941.

and display. Gradually Owen himself grew more interested in the non-surgical aspects of his work, and the Council rightly decided not to support him in turning the Hunterian Museum into the national museum of biology. He withdrew to new triumphs in the Cromwell Road, but the Hunterian Museum continued to be directed by outstanding men, and at the time of the air-raid disaster of 1941 was

the greatest anatomical and pathological museum in the world, purposely equipped to be, as it were, an advanced surgical textbook, comprehensive in scale, illustrated by the actual objects of research or discovery. Already, thanks to the generous support of its friends, the revived museum is taking shape on similar lines, and adapted to the needs of the day.

While Owen dealt with "the physiological series of comparative anatomy," as it was always called, the pathological museum was catalogued by James Paget, afterwards the leading surgeon of late Victorian London. Paget spent seven years at the task, educating himself far more deeply than he expected, and enormously widening the knowledge of pathological conditions available to his generation. Thirty years later he returned to the museum and personally re-examined every specimen for the revised catalogue. Study of the teeth became fully represented in the museum when the Odontological Society's collection was deposited in 1907. This collection has been notably developed by Sir Frank Colyer, and was ultimately presented to the College; it has survived the destruction of 1941.

Heyday of the Hunterian Museum

No part of the museum fell behind current knowledge. New material was continuously added and made the subject of regular demonstrations and lectures. A vivid account of the scope and nature of the work in what has been called "the heyday of the Hunterian Museum" may be read in Sir Arthur Keith's recent *Autobiography*. Keith's predecessors, William Flower and Charles Stewart, had devised excellent methods of teaching through museum display. Flower had a gift for such work and was also an anatomist of the first rank, his discoveries many and of high value. He was particularly interested in the evolution of man, and laid the foundation of the collection of skulls on which Keith laboured to such good effect. Stewart made his mark as a great lecturer, and the importance of this side of the work was brilliantly maintained by Keith. Stewart was also a founder of the Anatomical Society, which was thus for many years brought into close contact with the College, just as Owen and Flower had forged an enduring link with the Zoological Society. Recently it has been the policy of the College to bring the specialist surgical societies into amicable concordance.

Keith, whom Sir D'Arcy Power called "John Hunter Redivivus," described with frankness the difficulties as well as the achievements of his conservatorship. The permanent head of the scientific department appeared to his staff and to the profession as the directing spirit of the College; yet he found himself without a voice in decisions of policy or expenditure. The organization of the College for research and teaching has been only one aspect of the duties of the Council. As the representative corporation of the Surgeons of England it has watched and guided every contact between the profession and the State, from the Anatomy Act of 1832 through the Medical Acts of Victorian times to the vast legislation of to-day. In this public activity successive generations on the Council have acted with cautious liberalism. This has been reflected in the gradual extension of College privileges first to the whole body of Fellows, then by the admission of women to equality with their brethren, and, most recently, by the gathering in of the related specialties to the surgical centre.

Under the dynamic impetus of Moynihan, and with the support of generous benefactors, the College inaugurated between the wars a department of surgical research. Research had always been a main activity of the museum staff, but now the College was able to provide opportunity and training for young men and women in experimental surgery. Nerve grafts, traumatic shock, cardiovascular surgery, the biochemistry of the blood system in relation to the post-operative state, problems of bone sarcoma, are only a few of the subjects usefully investigated, while a research chair in ophthalmology was founded in 1942 jointly with the Royal Eye Hospital.

In celebrating its 150th anniversary the College draws inspiration from all this good work of the past. It intends, by increased activity in teaching, in research, and in the provision of collegiate life with all the valuable amenities of its social contacts, to promote "Arts which," in the words of the College motto, "are useful to all."

NATURAL HISTORY OF SURGICAL INFECTION

MOYNIHAN LECTURE

The Moynihan Lecture was delivered before the Royal College of Surgeons on June 19 by Professor F. M. BURNET, director of the Walter and Eliza Hall Institute of Medical Research, Melbourne. His subject was "The Natural History of Surgical Infection."

Professor Burnet said that since 1922 he had been a "laboratory man." He had spent his time in Melbourne on a wide range of experimental work within the broad general field of infectious disease. On top of these laboratory studies he had done his best to look at the general problem of infections. He proposed to address himself in this lecture to the natural history of some types of surgical infection. He mentioned first the difficulty of classifying infections into medical and surgical types. Infection by the organisms of malaria and trypanosomiasis, of scarlet fever and typhoid, for example, must be regarded as medical. In his own field of virus infections, the province of the surgeon was rather small—perhaps only granuloma inguinale could be regarded as a typical surgical infection as against a vast number of medical ones.

Of all the agents of surgical infection the only one with which he had worked at all extensively had been the staphylococcus. His introduction to this organism in 1928 came about owing to the deaths of twelve children and the severe illness of six others in a district of Queensland, following immunization against diphtheria. What was then the orthodox prophylactic agent had been used, a mixture of toxin just neutralized by antitoxin. Each of the surviving children developed a staphylococcal abscess at the point of inoculation. An exhaustive investigation failed to indicate any possible cause of death other than staphylococci conveyed by the needle. From the skin of one of the children first inoculated a strain of the organism must have been cultured. On inoculation into other children it provoked in some cases a fulminating toxic condition and in others a severe local sepsis. A similar differentiation was always found in epidemics, where some infections were so slight as to be recognized only by serological tests, while others caused an acute and fatal illness. This held good equally for protozoal, bacterial, and viral infections.

Evolutionary Approach

It was probably generally accepted by microbiologists interested in these problems that at an early stage of evolution a certain standard pattern of living structure was developed. Of present-day forms the closest approach to such a prototype might be one of the robust bacteria grown in a simple medium. This bacterial structure was built up essentially of proteins composed of a certain number of amino-acids, but it also contained other elements common to all living matter. Perhaps the primitive bacterium was the most successful in its ability to convert the largest fraction of its environment into living structure.

Wherever on the surface or in the internal passages or cavities of an animal there were dead desquamating cells a microscopically dense population of micro-organisms, principally bacteria, existed. Essentially these were harmless scavengers. In the human body the staphylococci of the skin and nasal mucosa occupied that situation. Similarly with the coliform bacilli of the bowel.

There were many varieties of these bacteria which had evolved a mode of nutrition needing only a minor modification to allow them to attack human cells. The modification might be by bacterial mutation or by local change, particularly as a result of trauma. Owing to the enormous numbers of individuals involved in each generation, bacteriologists could easily demonstrate in a matter of weeks processes equivalent to those which in large organisms it might take geological periods to bring about.

Experimental bacteriologists often spoke of increasing virulence by passage to such-and-such an animal—in other words, by the selection of more virulent mutants. This process was subject to considerable limitations. Anyone who had worked on experimental infections, whether with viruses or bacteria, was usually concerned to obtain for his particular work a strain of the highest possible virulence and of regularly reproducible virulence. It was a common experience to start with a large number of strains and to have considerable difficulty in finding one in which the regularly reproducible virulence was sufficient. But on occasion man could provide conditions more favourable to the survival of organisms of high virulence than anything that was possible in the laboratory.

Resistance and Reaction

The lecturer next turned to the other side of the interaction of host and parasite, namely, man's resistance to what might be called the most primitive form of infection, the capacity of bacteria to enter the cell and multiply there. Some day a successor to Metchnikoff would spend fascinating years working out the comparative biochemistry of the processes of resistance and immunity. Here he wanted to touch on the basic phenomena of inflammation and repair and to inquire in what directions this would be likely to develop during the course of evolution in man.

The present oecological situation of our own species was totally different from that which obtained during almost the whole of the evolutionary process. Our characteristic urban aggregations of population had developed only over a few thousand years. Evolution of man was essentially the evolution of solitary arboreal mammals living rarely in more than pairs or family groups, and it was reasonable to suppose that man's deep-seated physiological adaptation had been moulded by that particular environment and mode of life. The characteristic general infections of solitary jungle animals were insect-borne protozoal infections. It must be remembered that in the wild any severe injury was always lethal and therefore of no importance in evolution ; but minor traumatic lesions, especially skin abrasions, were so common that means must have been evolved for their permanent repair.

Any animal which in nature suffered a severe infection was unlikely to survive. The processes which did on occasion deal effectively with such infections in vulnerable areas must be regarded as essentially local manifestations of a response which had been evolved to deal with superficial infections following trauma. It was clearly of high survival value to the species that minor trauma should not provide an effective entry for pathogens. Any animal which lacked an effective method of preventing infection from minor skin abrasions would be eliminated.

Allergic Phenomena

Like other immunologists, he had always found the interpretation of allergic and anaphylactic phenomena interesting. Immunological sensitization must in some way be a manifestation of a mechanism which at some period had significant survival value. Many things appropriate to a local situation would be disastrous if applied generally. Perhaps the basis of allergy was to be found in relation to the problem presented to the animal by minor traumatic infection in species which had already developed something equivalent to the antibody mechanism.

His feeling was that in the field of bacterial hypersensitivity they were concerned with a mechanism evolved to deal effectively with an infective traumatic lesion of the skin. The most easily observed example of this was probably to be seen in the reactions following repeated Jennerian vaccination against smallpox. On vaccination of an adult never previously vaccinated the skin showed very little response for two or three days and then there was a violent inflammation which reached its peak on about the tenth day. In a well-vaccinated subject, on the other hand, the response was both accelerated and weaker.

In all probability some of the special features of that reaction depended on the fact that a virus rather than a bacterium was involved, but it could be regarded as a special type of traumatic infection. The principle was one of great importance to pathology. When a body mechanism had been evolved it could be expected to function satisfactorily only on dealing with the standard and common type of situation which was by a selective process responsible for its evolution, but once the mechanism had been established it would be called into action by any other more or less relevant situations, and more or less effective responses might be given.

It was well known that a staphylococcal infection in a newborn infant might be extremely serious. The chief interest of these lesions was their extensive spread with minimal inflammatory reactions. Staphylococcal infections during childhood were usually trivial, but they must be constantly occurring with skin abrasions. At adolescence came the "spotty" stage, particularly in males, when staphylococcal lesions, boils, and pimples were common. Hay-fever also tended to appear at this time. During adolescence and young adult life the human being responded too violently to infections.

There was one further type of staphylococcal infection he wished to mention—namely, staphylococcal pneumonia. For some staphylococci the respiratory surface offered a highly favourable site for multiplication. One implication brought up a question which he and many others interested in influenza had frequently asked. If in 1918–19 they had possessed their present armament of antibiotics, would the mortality of the influenza epidemic have been different ? In the early stages of the epidemic no doubt many lives would have been saved, but as antibiotics became universal resistant types would become obvious, and the ultimate mortality might not have been greatly different. Evolution was always going on, and proceeded far more quickly in micro-organisms than in man.

Progress on solving problems connected with safety in the mines is reviewed in the *Twenty-seventh Annual Report on Safety in Mines Research, 1948* (H.M.S.O., 3s. 6d.), by the Ministry of Fuel and Power. Investigations into the performance of instruments designed to sample air-borne dust clouds have been continued, and the results of experiments designed to test the accuracy of the British konimeter and of two modern types of hand filter-pump sampling instruments are discussed. These are compared with other commonly used instruments. The presence of a preponderance of fine particles in a dust causes an underestimate of the particle count when densitometric methods of sample evaluation are used. A preponderance of coarse particles has the opposite effect, but is not so important in practice. Examination of methanometers and recorders whereby fractional percentages of methane can be ascertained quickly shows that none of the detectors available to-day is completely satisfactory. Such instruments should be reliable, accurate, robust, and portable. They should also, if possible, be simple in design, easy to maintain and service, and rapid to operate. A detailed study of one make of methanometer has shown that great accuracy can be achieved by a small modification in design. An infra-red gas analyser for estimating carbon monoxide is being tested. Studies on the relative permeability of natural and synthetic rubber have shown that the synthetic compound has advantages. The loss of methane from a bladder made of synthetic rubber was only one-tenth of that from some other types of bladder.

HOSPITAL MORALE

"DEGREE, PRIORITY, AND PLACE"

A useful inquiry into the attitudes of nursing, clerical, and ancillary staff at the Central Wirral Group of Hospitals, Cheshire, has been carried out by the Department of Social Science of Liverpool University.[1] The investigation was undertaken at the request of the hospital management committee so that "a sound personnel policy might be developed" in the Central Wirral Group. The members of the staff of the hospitals were taken into the confidence of the investigators. Level of morale was defined as "the degree of awareness of the common objective to which human endeavour is directed within the organization and the vigour with which that purpose is pursued." A random sample of 210 people was taken from the staff population of 938, and the inquiry was carried out in the summer of 1949. The report showed that morale was high, and that 87% of the staff taking part felt that their hospital was happy, 9% that it was not, and 4% were doubtful.

Accurate rates of labour turnover could be calculated only from April 1, 1949. The average annual rate was found to be 24% for nurses, and 51.6% for domestic and ancillary workers; if this rate remains stable, one-quarter of the nursing staff and one-half of the remaining staff will have changed in a year. But the wastage of nursing trainees is high—about 50% in the first year—and the report emphasizes the need for preliminary selection of applicants for training. Another 10% fail the final examinations, so that out of every 100 student nurses who start only 40 are likely to complete their training. The turnover rate for ancillary staff is said to be higher in some other hospitals, where it sometimes exceeds 100%. The average yearly percentages for absence from duty were for nurses 3.29%, and for other staff 2.10%. These figures are well below the average in industry.

Questioned on why they had taken up hospital work, 72% of the nurses gave as their reason interest in the work; 45% of the administrative staff gave this reason, and 27% of the ancillary staff. Only 1% of the nurses gave as their reason "security of the work," though 13% of the administrative staff and 4% of the ancillary staff gave this reason; 13% of the nurses thought it was the best job available, and 8% did not know why they had taken it up. When the group was divided according to sex, 22% of the men favoured the job because of its security, and 4% of the women. Of those interviewed, 92% of the women and 88% of the men said they liked the work. All those who disliked it were employed at the three largest hospitals in the group.

Class Distinction

The report discusses at some length "the very emphatic class distinctions which colour the employment relations within the hospital." There were found to be rigid barriers between the various grades of hospital staff, and the lot of the domestic workers within them was the most unhappy, for their group had the lowest status. A nurse when asked what her job was usually said that she was a nurse, but a domestic worker usually replied that she was employed at Hospital X. Segregation of different grades at meal times was criticized as an example of class distinction, and one person said that class distinction was taught to nurses in the lecture rooms.

The report considers that undue emphasis is being placed on the social status of the nurse. For example, a hospital (not in the group) advertising in the Press for nursing students appealed to "young ladies" to train as nurses, stating that there would be opportunities to meet other "young ladies" already training at the hospital. The people in this group appeared to be much more class-conscious than the community at large, and segregation was particularly marked in the larger hospitals. The class groupings are accentuated by being associated with occupation, for it was difficult to move between occupational groups.

The report believes that in some hospitals if an applicant for training as a nurse has done domestic work in a hospital that fact in itself might prevent her acceptance as a student nurse. In many other hospitals, says the report, the matron would accept domestic workers as nursing trainees only if their domestic work had been at another hospital.

Satisfaction in Job

Of those interviewed, 72% said they enjoyed their work very much, and only 1% disliked it very much. The people who disliked it were all employed in the three largest hospitals. About 41% were dissatisfied with promotion, and in this connexion the grade of male nurses was often referred to—by both men and women. A number of male and female nurses thought that nurses of the opposite sex were promoted more quickly than those of their own sex. The report adds that many of the opinions expressed appeared to indicate that the male nurses are assuming all the defensive characteristics of a minority group.

The hours of work were criticized in various ways. The nursing and ancillary staff mostly worked a maximum 96-hour fortnight. It was found that 71% of the staff worked longer than the normal industrial 44-hour week. Over half the nursing staff said that during the week when they were interviewed they would be working more than 50 hours. The report concludes that though shift work is not completely satisfactory it does fit in more closely with the normal pattern of life than the systems of hours worked at present.

Community Life

The need for security in the job is felt by most employees, but it may be only misleadingly expressed by reference to financial security or security against dismissal. "It is difficult for the management of any organization to discuss with the staff the deeper emotions involved." The most important factor is the atmosphere created by the supervisor in relation with his subordinates. Another important factor is that any member of the staff must know exactly what his supervisor expects of him. The individual desires to "belong" to his community, and the relation of superior to subordinate, and of employer to employee, is therefore important.

Nursing sisters did not usually discuss progress reports with the students concerned, with the result that the students were often uneasy about how they were getting on.

All the people interviewed at the smaller hospitals were satisfied with the supervision, and in the whole sample 83% of the nurses were satisfied, 95% of the clerical staff, and 87% of the ancillary staff. One-half of those who disliked their work were also dissatisfied with the supervision. A rigid system of discipline can be accepted if it is consistent and if the relationship between the individual and his immediate supervisor is satisfactory. The report suggests that a course of training on supervision should be given to every person inside the hospital who is in charge of others.

Some of the staff were aware of unsatisfactory elements in residential life. "The desire for variety and for the comfortable security and affection of domestic life was indicated." Isolation is an unsatisfactory working condition, although at times it may be necessary, and small working groups are usually more satisfactory than larger ones. Where a few individuals must work in isolation, methods of counteracting the effects of it should be considered.

In answer to the question "What changes would you like to see in the hospital?" 84% suggested joint consultation. This was the highest percentage of unanimous suggestions for improvements. In this connexion it is interesting to note that the Ministry of Health has recently sent a circular to hospitals (*Supplement*, June 17, p. 284) advocating the setting up of consultative committees.

[1] *Employment Relations in a Group of Hospitals.* By Joan Woodward, M.A. London: The Institute of Hospital Administrators. 1950.

A film entitled "Before and After the Baby" demonstrates the antenatal and post-natal exercises devised by Miss Margaret Morris and Miss M. Randell, of St. Thomas's Hospital. It runs for 30 minutes and is 16 mm. size. Copies are available for hospitals and medical schools. Information may be obtained from Movement Therapy Films, 299, West George Street, Glasgow, C.2.

NUFFIELD FOUNDATION

ANNUAL REPORT

The annual report of the Nuffield Foundation for the year ended March 31, 1950, was published on June 29. It discloses that the Foundation is now prepared to make grants in support of research to Dominion universities and similar institutions within the British Commonwealth. In recording this decision the Foundation also records its opinion that: "The strengthening of academic links throughout the Commonwealth—important as that is for its own sake—may well affect the growth and spread of all those activities in which Britain should be lending its great and greatly desired influence. In intellectual as in other enterprises this country has no need to abdicate its proper precedence."

The first opportunity under this new policy arose when the Government of New South Wales established the first university of technology in the British Commonwealth. By a grant of £25,000 the Foundation has endowed there a Nuffield research professorship of mechanical engineering.

Alongside this new development some of the subjects which the Foundation pursued in its first five-year period continue to be supported by new or renewed grants. Five medical grants mark the Foundation's interest in normal health and in medico-social research:

£2,000 to the Nuffield Institute for Medical Research, Oxford, for the combination of *x*-ray with cinematographic and microscopical techniques in the study of the normal workings of the body. This is a continuation of a grant which assisted the late Dr. A. E. Barclay and the team led by Dr. Trueta in their studies of the renal shunt mechanism.

£900 for an inquiry by the Department of Social and Preventive Medicine, Queen's University, Belfast, into health in the linen industry of Northern Ireland. Weaver's deafness and mill fever are among the problems to be studied.

£6,000 for a further follow-up of the 1,400 children born in one week in March, 1946, to bring the social and medical history of their health and development up to their fourth birthday. The first follow-up on their second birthday—which the Foundation also financed—has already shown many more cases of infectious and other diseases than are officially notified, a marked difference in the size and weight of children from different social classes, and a great improvement in family housing conditions between 1946 and 1948. This study is being conducted by a joint committee of the Royal College of Obstetricians and Gynaecologists, the Population Investigation Committee, and the London Institute of Child Health.

£3,000 for another study of child-development, by the Institutes of Child Health and Education, University of London, which will start with the mothers attending an antenatal clinic and will continue through the successive stages of each child's development.

£1,000 towards the expenses of a survey of the nutritional state of old people living on their own in Sheffield, to be conducted by the Department of Social and Industrial Medicine, University of Sheffield.

Cortisone and A.C.T.H.

In research on rheumatism—for which the Foundation holds a generous additional endowment from Captain Oliver Bird, *M.C.*—attention is being concentrated on the study of cortisone and A.C.T.H. For attempts to synthesize these or simpler substances with the same effects, and for the study of how these new substances work, the Foundation has promised grants totalling £48,800:

£16,000 to the University of Cambridge for the School of Biochemistry under Professor F. G. Young, F.R.S., and the Chemical Laboratory under Professor A. R. Todd, F.R.S., who are collaborating in work on A.C.T.H. After the isolation and purification of A.C.T.H. its fission into peptides will be investigated and their synthesis attempted.

£10,000 to the University of Oxford for work directed by Sir Robert Robinson, O.M., P.R.S., in the Dyson Perrins Laboratory on methods of partial or total synthesis of cortisone and analogous substances, particularly the androgen analogues of cortisone.

£2,200 for research work under Professor F. S. Spring at the Royal Technical College, Glasgow, principally on vegetable sources for cortisone. Ergosterol derivatives will be studied and a search made for suitable sapogenins of the type discussed in an annotation last week (p. 1477).

£5,600 additional grant to the University of Manchester's Rheumatism Research Centre, which the Foundation initiated with £100,000 in 1946, for additional staff to work under Dr. J. H. Kellgren on elaborate investigations of the effect of the new anti-rheumatic substances, and for apparatus for examination of rheumatic tissues.

£5,000 to the University of Leeds, where Professor W. T. Astbury, F.R.S., is collaborating with the Manchester Rheumatism Research Centre in studying—by *x*-ray analysis, electron microscopy, infra-red, and other physical techniques—the tissue-disturbances that follow treatment by cortisone and A.C.T.H.

£10,000 for a new research unit in St. Mary's Hospital Medical School to study, under Professor G. W. Pickering, the actions of cortisone and A.C.T.H. in rheumatic and other diseases.

In addition to these grants, a total of £8,825 has been expended on other scientifically controlled studies of different forms of treatment for rheumatism.

New Programme of Grants

For its second five-year programme, of which this annual report covers the first year, the Foundation hopes to devote a major part of its resources to fundamental research, especially but not exclusively in the fields of biology and sociology.

Biological research has been supported by a total of £46,750 during the year. The studies helped by grants are on such subjects as the factors determining the difference between cell-types; different types of learning-systems, using electronic methods; the control of regional determinations in embryos and of the migration of cells in embryos and in adult life; *x*-ray analysis of crystals of complex substances of biological and medical importance; and the study of cell biology, using the method of tissue culture.

For sociological research the Foundation has made grants totalling £33,000. A survey is being conducted by the Department of Economics, University of Aberdeen, of the costs of founding a family and raising the next generation of children. The budgets of young couples of all social classes—without children, with one child, and with two children—are to be studied and compared, so as to throw light on the changes in the pattern of expenditure which follow the arrival of the first and second babies. The Family Welfare Association and the Tavistock Institute of Human Relations are to study the patterns of family life and the individual and community relationships which contribute to those patterns. The London School of Economics and Political Science is to set up, within its new Department of Sociological and Demographic Research, a division devoted to research techniques. The division, under Professor M. G. Kendall, will be concerned with the application of existing and new statistical methods to social surveys and will study the techniques of sample-interviews which—though much relied upon, by governmental and commercial agencies, for surveys of fact or opinion-polls—need to be made more reliable by independent academic research.

A grant of £5,000 is for a follow-up, by a research committee under Professor Sir Godfrey Thomson, of a sample of 2,000 Scottish children—out of all the 11-year-olds, whose intelligence was tested in 1947 with the help of an earlier grant from the Foundation—to see what happens in after-life within our society to children representative of the whole range of intelligence from the very bright to the very dull.

Practical Problems

Beside research directed to discovering new and fundamental knowledge, the Foundation is anxious also to support some attempts to apply existing knowledge and scientific techniques to the investigation and solution of some of the contemporary problems of practical importance. Many of these problems—like industrial efficiency or the development of some under-developed area in the Empire—are so bewilderingly complex that a new technique in "combined operations" by a variety of experts is needed for their analysis and solution. In the attempt to support projects of this sort, and to find and assemble experts of the many different skills willing to work together in search of an answer, the Foundation is prepared for some wastage and failures.

In the past year only one small-scale attempt has been started as an essay in this kind of practical co-operative research. Up to £2,000 has been set aside to finance the first steps in an investigation of the validity of motion and time studies, which are commonly used and accepted in the U.S.A. but less confidently in this country, to improve industrial efficiency. A committee of physiologists, psychologists, statisticians and experts in management, under the chairmanship of Professor Sir Frederic Bartlett, F.R.S., is directing the inquiry. As a first experiment a score of experienced time-study practitioners are to be tested and compared on specially designed operations carried out under laboratory conditions, to establish the consistency of their methods.

The Foundation is continuing, unchanged or slightly modified, its United Kingdom schemes of training and travelling fellowships or scholarships for medicine, dentistry, farming, and social work; and for the older Dominions its travelling fellowships in medicine, the humanities, the natural and the social sciences, as well as similar fellowships now offered to the new Dominions of India, Pakistan, and Ceylon; travelling fellowships for Southern Rhodesia farmers; and a panel of medical visitors to the Colonies of West and East Africa.

Apart from research into the processes and effects of ageing, the Foundation now discharges its obligation to promote the comfort of the aged through the National Corporation for the Care of Old People, to which the Foundation is paying £60,000 —the balance of the promised endowment of £500,000. In commenting on the National Corporation's own annual report, the Foundation re-emphasizes the need for co-operation between voluntary bodies and local authorities, a need sometimes lost sight of among the prejudices of parochial squabbles. The Foundation applauds the attempts by the National Corporation to bridge the gap between the health service and the welfare acts.

Altogether the grants promised during this first year of the Foundation's second quinquennium amount to £506,925, and to meet them a total of £377,425 has been allocated from the year's income; in addition, previously promised grants to a total of £135,000 are to be met, making a total allocation of £512,425 for the year. Only £204,500 remains to be met from the income of succeeding years, because it is the Foundation's policy to leave the income of future years free, so far as possible, for new ventures.

Nova et Vetera

THE PORTRAITS OF WILLIAM HARVEY

In my monograph on *The Portraiture of William Harvey*, published by the Royal College of Surgeons last year, I described the interesting etching of Harvey sometimes attributed to Hollar, but now tentatively assigned to Richard Gaywood. I had previously written about the etching in this *Journal* (1944, **2**, 669, where it was also reproduced), suggesting that it had possibly been done from the life, since it seemed to me to be a "most vivid and life-like representation of Harvey," even though the technique was not good enough for Hollar. In my monograph I also suggested that the etched frontispiece to the first edition of *De Generatione Animalium*, 1651, was almost certainly by Gaywood.

Professor Charles Singer, in reviewing my monograph (*Journal*, 1950, **1**, 1259) characterized the portrait as "an unhappy etching. . . . It suggests an irritable, punctilious old man suffering from bodily discomforts. . . . This picture, we feel, is perhaps best forgotten, except by iconographic experts." The fact that a portrait gives an uncomfortable impression of the subject is not, however, ground for relegating it to oblivion. It was the very fact of its discomfort, seeming to agree with what is known of Harvey in his old age, that gave me the impression of its being an honest, and therefore an important, representation of his personality.

I have now received most interesting confirmation of the importance of this portrait in an extract from a letter written by Dr. Jasper Needham, F.R.S., to John Evelyn, dated Covent Garden, April 5, 1649, as follows: "Dr. Harvey's picture is etcht by a friend of mine and should have been added to his work, but that resolution altred: however I'l send you a proof with your books that you may bind it up with his book De Generatione. I'm sure 'tis exactly like him, for I saw him sit for it. One in this towne is making his statue in white marble." This extract is given by the courtesy of the librarian at Christ Church, Oxford, where the Evelyn books and papers from Wotton House are now housed, and is printed by permission of Mr. John Evelyn.

It is now clear, therefore, that the etching was done from the life and was intended for insertion in the first edition of *De Generatione Animalium*, 1651. Evelyn had his proof duly bound up in the book which is now at Christ Church, but no other copy of the book containing it has ever come to my notice. The etching is uncommon, but to the three impressions previously recorded in this country (Royal College of Surgeons, Royal College of Physicians, British Museum Print Room) three more can now be added—one recently acquired by the Wellcome Historical Medical Museum, and two in the Evelyn collection at Christ Church, one being in the *De Generatione* and another in an extra-illustrated copy of Evelyn's *Diary*. There is a seventh in an American museum. The "statue in white marble" mentioned by Dr. Needham was no doubt the one placed in the College of Physicians in 1652, and destroyed in the fire of 1666.

GEOFFREY KEYNES.

Reports of Societies

TREATMENT OF OBSESSIONAL NEUROSES

In the Section of Psychiatry of the Royal Society of Medicine on June 13, with Dr. W. J. T. KIMBER in the chair, a discussion took place on the treatment of the obsessional neuroses. It had been hoped to stage a lively exchange of views between the exponents of physical therapy and of psycho-analysis, but the result was rather disappointing.

Dr. EMANUEL MILLER said that he accepted the classical Freudian psychology, with certain qualifications. He thought that in the subject under discussion due regard had to be paid to psychotic undertones. Despite his conviction of the value of Freudian psycho-dynamics, he felt himself free to vary his practice and his treatment by the use of ancillary methods such as narco-analysis or abreaction techniques. What rendered obsessional neuroses interesting was not solely the bewildering variety of their manifestations but the relation they bore in psychopathology to certain other conditions which might be either simple in structure or infinitely complex. Among the less complex states he referred in particular to those obsessional conditions which were closely related to anxiety proper.

In looking through case studies which he had made on his patients—hospital and private—from 1921 to the present day, he noted the frequency with which presenting anxiety symptoms were associated with obsessional personality traits. The ruminative type of obsessional neurosis was extremely difficult to treat by analysis. He mentioned one case in which a compulsive ruminant disclosed more or less openly incestuous fantasies of the most lurid kind. The patient's anxiety was severe and it was necessary to transfer him to hospital, where he quieted down, not so much under the influence of sedation as under that of his physician. But even the physician was unable really to get to grips with the issue. Nevertheless, during this period of quiescence and isolation from the ordinary problems of life he was able to settle down, and after three months in hospital he returned to work, with no complaint of a compulsive kind since.

Dr. Miller added a word or two about obsessional compulsive states in young subjects with indications of sub-schizoid personality traits. Before embarking on psychological treatment a considerable time should be devoted to personality study

to make sure that there was not actual schizophrenia. Referring to obsessional and compulsive behaviour which was common in children and to the treatment of the child (and instruction of the parent in nurtural technique) he said that in children it was noticeable how little troubled they were about their own obsessional practices, which they seemed to accept as a part of life. Some children of high intelligence appeared to be able to exhibit some of the sophistications of the adult ruminant.

The extreme compulsive type of obsession was rare, and patients who gave evidence of it would have to be considered in the light of neurosurgery. In milder cases the phobias held with an obsessional-like intensity should if possible be given the opportunity of long-term analysis. Reference should be made to constitutional factors and family history, with evidence of maladjustment from the earliest period of life. If the psychiatrist could lay his hand upon the particular logical formations in ruminants and find the weak points in the façade, remembering that all their defences were likely to be in the front line and therefore their lines of communication would be weak, there was a possibility of breaking down their "logic" and exposing the underlying weakness, but there was also a danger of bringing about depressive states. The obsessional states for which leucotomy was to be considered were very rare. Most obsessional types were very much mixed with varying psychotic processes.

Dr. KARIN STEPHEN followed with a long paper dealing in a theoretical way with the part that analysis might play in the treatment of obsessional neurosis. She suggested that psycho-analysis with its more gradual approach might be of greater benefit than other forms of psychotherapy which made a frontal attack upon the condition. It enabled the patient by this gradual process to develop his own powers of mastery. There was need for much further research to work out the unexplained reactions of body and mind and for combined research between psycho-analysis and other branches of psychotherapy.

Physical Methods in Treatment

Dr. ELIOT SLATER, in a joint communication with Dr. WILLIAM SARGANT, gave a short account of physical treatments. He said that the practice of treating obsessional neurosis varied from centre to centre and from psychiatrist to psychiatrist. Some considered that all sorts of disorders were best treated by psychotherapy, others that they were better treated by shock methods or narco-analysis. This was a state of affairs which could not be tolerated for long. Somehow or other they must learn to say, not only that such and such a patient might well be treated by method A, but also that methods B, C, and D were inappropriate. Before this could be done a great deal of information had to be accumulated, and he appealed to their psycho-analytic and psychiatric colleagues to come forward with their own statistical results. In obsessional neuroses the therapeutic confusion was at least as great as in any other field. The obsessional constitution was tough, solid, and obstinate. Under insulin treatment the patient usually felt a little better while in the semi-stuporous state, but afterwards was worse. Under sleep treatment he was likely to become confused. Leucotomy would often have a beneficial effect on the anxiety and tension, and yet in spite of that the compulsive thought would remain.

Sleep treatment was only occasionally of value. After drug withdrawal there was an increased risk of confusional states, which might even land the patient temporarily in a mental hospital; well-established obsessional behaviour patterns were not touched. Sometimes, however, one would find an obsessional patient who had succeeded in keeping his neurosis under control, but as a result of new mental pressures he became anxious, worried, and exalted. Such a patient might be helped by sleep, which would relieve anxiety. He had no recollection of obsessional patients, not schizophrenic, being benefited by insulin-coma treatment; he and his colleagues had had no success at all in that respect. Treatment by electro-shock methods required more discussion. He had never known tension to be relieved by electro-shock, not even after intensive courses. The idea that electro-shock was half-way to leucotomy was false. The hope that electric convulsion therapy would benefit obsessional states had not in his experience been borne out. Anxiety flared up, and the state of the obsessional patient after treatment might be worse than before.

On the question of leucotomy, at one time they were inclined to think that they had better results after leucotomy in obsessional states than in any other condition in which the method was used. Later experience had not been so encouraging; although there had been excellent results in some cases, others had derived no benefit. Developments in operative technique would no doubt in time lead to the discovery of an operation which would produce maximum relief with minimum damage to personality. It was not to be expected at present that obsessional rumination would disappear without signs of personality flattening. Of 22 cases treated by leucotomy since 1942, including only those cases in which there had been time to judge results, nine had made a recovery and only three had received no benefit; the remainder showed various degrees of improvement. All these patients had been clinically investigated and earlier had been considered intractable.

Obsessional states which were monosymptomatic responded very well. Several who failed to improve after the first operation did well after the second. Age was no bar to treatment. One woman aged 72, whose illness was of 20 years' duration, was now well. Young patients, however, usually did not do very well, and he deplored the application of the operation to children until there was more understanding of it. A few patients after operation fell into a characteristic schizophrenic state. He did not wish to suggest that the leucotomy was the cause, but it seemed possible that leucotomy might loosen the defences of the organism and enable the schizophrenic personality to make headway. Many problems remained unsolved, but every year brought a new advance, and in an individual case if they were on uncertain ground surely they could hold their hands a little.

The PRESIDENT (Dr. Kimber) said that it seemed too often to be not the need of the patient but the predilection of the physician which determined the treatment. As for leucotomy, as Dr. Slater had suggested, this might break down the defences of the organism and release a psychosis. They were also told that analysis might destroy the defences in the same way.

The discussion appeared to exhaust itself with the openers, and only a few remarks were made by Dr. CLIFFORD SCOTT and another speaker. Dr. W. SARGANT, who, as honorary secretary of the Section, had arranged the discussion, said that he was sorry that it had not produced a real clash between the advocates of different methods. Patients were being constantly sent to him for an opinion, and he had to advise them whether they should undertake the large expenditure of time and money involved in psycho-analytical treatment. He had hoped to learn from psycho-analysts what sort of cases were likely to justify such expenditure. In the matter of physical treatment Dr. Slater and he had set out with as much particularity as possible their experience and ideas, and he trusted that at some future date the analysts would be equally definite about the treatment they were using, its indications and effects.

SOCIETY FOR THE STUDY OF FERTILITY

INAUGURAL CONFERENCE

The inaugural conference of the Society for the Study of Fertility was held in the lecture-room of the Zoological Society of London on June 16 and 17. With Dr. A. S. PARKES, F.R.S., in the chair, a resolution to call the Society into being was formally adopted, a constitution was approved, subject to ratification at the next annual general meeting, and officers were elected, the first chairman being Dr. Parkes. It was agreed that the object of the Society should be the promotion of the study of fertility in all its aspects, and that it should serve to facilitate the association of workers in the medical, biological, and veterinary fields. Membership of the Society is therefore open to all professionally qualified men and women with an interest in this subject.

The opening paper of the conference, read by Mr. KENNETH WALKER, was a survey of the diagnosis and treatment of male infertility. This was a balanced summary of the present clinical position in which Mr. Walker stressed the importance of functional aberrations—impotence, premature ejaculation, and the like—and the need for sympathetic handling in any attempt to overcome these common but usually neglected factors in male infertility. He acknowledged the value of testicular biopsy, but was compelled to admit that all forms of specific therapy for defective spermatogenesis were, so far as he was able to determine, extremely disappointing. He had taken the view that defective semen, though it might achieve conception, was apt to be associated with subsequent abortion; but he expressed his readiness to abandon this belief when, in the subsequent discussion, contrary views were authoritatively advocated by other members of the Conference.

Later in the discussion a suggestion was made by Dr. RAYMOND G. CROSS that in the case of excessively virilized males who nevertheless showed subfertility and who had small firm testes, with an excess of interstitial tissue, unilateral orchidectomy, by diminishing the androgen output, might reduce pituitary inhibition, which was assumed to be responsible for the defective spermatogenesis. Doubts were expressed by other members, who put forward reasoned arguments, based on known clinical and experimental facts, to the effect that the desired result would be very unlikely to follow the proposed operation.

Experimental and Biochemical Studies

Drs. R. G. HARRISON and A. G. OETTLÉ described a technique for producing experimental lesions in rat testes by controlled ischaemia for varying periods of time. It was found that histological pictures similar to those met clinically could be produced by this means, and that lesser degrees of damage were reversible but not so the more severe ones. This technique, the authors suggested, might prove useful as a preliminary to studying the effects of different therapeutic agents.

As an addendum, Dr. Oettlé reviewed the results of his studies on the fibrinolytic factor of semen. He pointed out that the fibrinolysin of blood plasma was now called plasmin, that it was derived from the action of a kinase on a precursor, plasminogen, and that an anti-plasmin was also present in blood. The fibrinolytic factor of semen, however, was not a kinase, nor was it derived from the action of kinase on a precursor, and it was unaffected by anti-plasmin. He concluded that it was a different substance from that found in blood, and suggested that by analogy it might be named seminin.

Dr. A. S. PARKES described some of the work being done in his department at the National Institute for Medical Research on problems relating to spermatozoa, ova, and fertilization. He and his colleagues had studied methods of preserving spermatozoa at low temperatures and had succeeded in keeping those of several species alive for periods of up to a year by quick freezing at −79° C., after the addition of glycerol. As yet, however, certain technical difficulties had prevented them from deciding whether or no fertility as well as motility could be so preserved. Dr. Parkes also showed some remarkable photographs, taken with the phase-contrast microscope, of the fertilization process in rodents. Mr. C. POLGE, from the same department, discussed the results of artificial insemination in fowl.

Dr. C. A. JOËL (Tel Aviv, Israel) reported on his studies of human spermatozoa with the electron microscope, showing some photographs taken with this instrument. The principal drawback to the technique at present was the necessity for dehydrating the spermatozoa during their preparation for electron-microscopy. It was uncertain how far this distorted their appearance, but Dr. Joël did not think that serious artifacts were produced.

Investigation and Treatment

Dr. SAMUEL L. SIEGLER (Brooklyn, U.S.A.) read a paper and showed a film on the investigation and treatment of human infertility, a contribution described by the chairman of the session, Dr. BETHEL SOLOMONS, as "encyclopaedic." So many facets of the problem were considered that it would be invidious to choose any one or two for comment. It must therefore suffice to say that Dr. Siegler placed most emphasis on the importance of regarding the infertile couple as a unit rather than as two independent "cases."

Dr. I. W. ROWLANDS read a paper on some observations on the breeding of dogs, which was notable for demonstrating how the accurate recording of straightforward data, such as the length of pro-oestrus and oestrus, incidence of conceptions from mating on known days, litter size, and foetal mortality, could establish new facts and disprove old theories.

Dr. MARGARET C. N. JACKSON discussed the finding of round-cell infiltration in endometrial biopsy sections. In 500 consecutive biopsies it was encountered on some 30 occasions. In this series of patients there were seven who were found to have tuberculous endometritis, though positive biopsies were not obtained in all cases, nor did guinea-pig inoculation always prove reliable. In most instances, however, no coexistent pathological changes could be demonstrated, and she was inclined to regard the infiltration as an incidental finding, except when obviously the result of a resolving previous inflammatory process, a view shared by other speakers during the subsequent discussion.

Dr. CLAUDE BÉCLÈRE (Paris) illustrated the place of hysterosalpingography in the diagnosis of sterility by means of a film strip which included a number of his early radiographs, obtained very shortly after the introduction of the technique. He believed that lipiodol was the medium of choice, and demonstrated the importance of the 24-hour film in the diagnosis of hydrosalpinx and other disorders. His exposition was illustrated by many fine *x*-ray pictures of developmental anomalies as well as of the more commonly encountered pathological conditions.

Following Dr. Béclère's paper, Dr. B. SANDLER demonstrated an instrument he had devised as an adjunct to hysterosalpingography with watery radio-opaque media. It consisted of a plastic rod with a metal marker in the head, and was inserted into the rectum during screening. The position of the marker being visible, it was possible to milk the medium along the tubes. By its aid patency could be proved or excluded without having to resort to a 24-hour film.

Dr. A. WALTON'S paper on the activity of spermatozoa *in vitro* was a summary of his studies on the respiratory activity of bull and ram spermatozoa.

The final paper of the meeting, given by Dr. BETHEL SOLOMONS (Dublin), was entitled "Some Conclusions about Infertility." Believing that prevention is better than cure, Dr. Solomons was convinced that a good deal of infertility could be prevented by the adoption of a healthier mental attitude towards sex and by the adequate imparting of the essential knowledge to all young people—from an early age. He thought that it was not altogether Utopian to suggest that the passing of an examination in sexual hygiene should be an essential preliminary to marriage. Recalling what he had written on the subject in 1919, Dr. Solomons was reluctantly compelled to conclude that, beyond the introduction of tubal patency tests and of endometrial biopsy, the advances made in the investigation and treatment of infertility in women were disappointingly few.

The possibilities for old persons working in industry are discussed in *The Interests of the Aged*, the Report of the Fourth National Conference of the National Old People's Welfare Committee (London : 2s.). Mrs. Barbara Lewis, senior tutor in social studies, Birmingham University, stated at the conference that our kind of society and economic organization tended to produce a leisured but "functionless" old age. It was essential that old people should feel that they were wanted and had a contribution to make to the prosperity and well-being of the community. Sir William Douglas spoke on "Plans and Achievements Since the Passing of the National Assistance Act." The Conference represented many statutory and voluntary agencies working for old people.

Correspondence

Aminopterin for Leukaemia

SIR,—The excellent report by Dr. J. V. Dacie and his colleagues (June 24, p. 1447) on aminopterin in the treatment of acute leukaemia, and your leading article on this subject in the same issue, will be certain to stimulate fresh interest in this country in the therapeutic possibilities of folic acid antagonists in leukaemia and allied disorders. While the authors are rightly cautious in evaluating their results and in emphasizing the extreme toxicity of these compounds, the fact that both in America and here it has been possible to induce definite remissions in such a rapidly fatal neoplastic disorder is a finding of the greatest significance and an indication of the urgent need for continued work along similar lines.

While in America in 1947–8 I had the opportunity to carry out animal experiments with aminopterin and related compounds, and through the kindness of the Lederle Laboratories I have since been able to treat human cases of leukaemia in Edinburgh. Since January, 1949, I have treated 24 cases of acute leukaemia—10 adults and 14 children—and a preliminary review of results was published as part of a postgraduate lecture last year.[1] At the present time eight children of my series are surviving, the longest survival times among these being 12, 10, 8, 7, and 5 months from the start of aminopterin therapy. All the children who have done well have been cases of lymphoblastic leukaemia, mostly of the subacute aleukaemic variety. I have obtained no significant response to aminopterin in any of the adult cases, or in children with the more fulminating acute form of the disease, where haemorrhage presents a very difficult feature to treat.

All of my cases have been given the aminopterin by mouth in tablets made up to contain 0.5 mg. of the drug. Initial dosage has varied between 0.5 and 1.0 mg. daily, and the latter dose has never been exceeded. Toxic manifestations, notably buccal ulceration, have occasionally demanded temporary cessation of dosage, and profound leucopenia occurring after about ten days of treatment is common, but I have come to regard the latter as a sign of favourable response and think that the drug should not be stopped on account of this alone. In one child whose total leucocyte count had fallen to 200 per c.mm. I discussed this point with Professor Maxwell Wintrobe, who visited Edinburgh in August, 1949, and he agreed that continuation of 0.5 mg. of the drug daily was probably the right course. Within a few days the count had risen again and subsequently returned to normal. During the period of severe haemopoietic depression that may precede a remission antibiotics are required to minimize the risk of infection, but few of the cases have needed transfusion at this stage on account of anaemia alone.

In the children who have responded to aminopterin the completeness of the remissions obtained has been remarkable, with disappearance of glandular, splenic, and hepatic enlargement, and a full return to normal both in the peripheral blood and in the bone marrow. I gather that neither Dr. Dacie and his colleagues nor recent American workers have noted a complete return to normal in the marrow picture, as they report a persistence of primitive leukaemic cells in the marrow in spite of remission in the peripheral blood. I believe this to be due to the treatment having been given in repeated courses rather than as continued maintenance therapy, as with the latter regimen I have now had several children in whom marrow smears taken some months after starting treatment have shown no evidence of disordered leucopoiesis, and in whom the diagnosis of leukaemia could not then have been made on haematological examination.

The mechanism of action of aminopterin is not at present understood, but from animal work I believe that the drug is rapidly excreted,[2] and that continued administration of small doses is likely to be more effective than short courses of larger amounts. The longest survival times in remission in my cases have been achieved by daily maintenance therapy of 0.5 mg.; but even on such dosage some cases have relapsed, and this raises the most interesting question whether the leukaemic process is in time capable of finding a way around the hypothetical biochemical inhibition by which the folic acid antagonists effect their action. Experience both in America and here is showing that with treatment with these compounds alone ultimate relapse in the leukaemic state seems inevitable. With this fact in mind I am at present administering an oral nitrogen mustard preparation (R 48) to cases which have responded to aminopterin in the hope that the combined action of the latter and an anti-mitotic agent may have the effect of delaying further the recrudescence of the leukaemic process. Three cases have so far been discharged from hospital on maintenance therapy with 0.5 mg. aminopterin and 50 mg. R 48 daily, and one, a girl of 3 years, has remained very fit after four months of such seemingly drastic haemato-suppressive therapy. Aminopterin is a dangerous drug and is not a "cure" for leukaemia; but its introduction has shown a ray of hope of the possibilities of chemotherapy in previously incurable disorders, and the need for further research in this field is pressing.—I am, etc.,

Edinburgh. JAMES INNES.

REFERENCES

1 Innes, J. (1949). *Edinb. med. J.*, **56**, 481.
2 —— Innes, E. M. and Moore, C. V. (1949). *J. Lab. clin. Med.*, **34**, 883.

The Cerebrospinal Fluid in Intracranial Otogenic Abscess

SIR,—I read with great interest the paper by Mr. W. R. Henderson and Dr. C. G. de Gutiérrez-Mahoney (June 24, p. 1461) on the cerebrospinal fluid in intracranial tumours, and with special interest the points about spinal fluid pressure. All associated with neurological patients will have shared their unfortunate experience: "In high-pressure cases we have seen several deaths directly attributable to lumbar puncture. . . ." They go on to say, "As is well known, the C.S.F. pressure may be high without papilloedema and, conversely, owing to spontaneous fluctuations, the pressure may be normal temporarily in patients with papilloedema."

They stress the fact that papilloedema makes lumbar puncture not only unnecessary but positively dangerous and that even before papilloedema appears many tumours can be diagnosed on clinical grounds alone. On the other hand, they say, high pressure may be the only objective evidence of an intracranial expanding lesion. They do not, however, make any mention of the information that can be obtained from plain radiographs of the skull. The dorsum sellae is sensitive to elevation in intracranial tension and manifests it *first* by a slight degree of decalcification. This occurs long before erosion of the posterior clinoid processes and still longer before erosion of the dorsum sellae.

One has seen several cases where this sign of dorsum sellae decalcification stands alone in directing attention to the firm diagnosis of tumour. To give but one example: I was recently asked to make a plain *x*-ray examination on a case in a mental hospital. The psychiatrist in charge of the case was very suspicious that the mental condition of the patient had an organic basis, in spite of the complete absence of physical signs and also in spite of a lumbar puncture which had been performed elsewhere a few days previously, revealing a normal fluid under normal tension. The radiographs showed quite marked decalcification, but no destruction of the dorsum sellae. One felt convinced that a tumour was present, and in this instance the conviction was made absolute by the presence of a displaced calcified pineal gland which lateralized the tumour. A few days later ventriculography demonstrated an expanding lesion at the right frontal pole, and at operation a large meningioma growing from the falx just above the crista galli, but not involving bone, was successfully removed and the patient was cured.

Although in general the dorsum sellae is certainly less sensitive to pressure than the optic nerve heads, one sees decalcification there without papilloedema sufficiently often for it to be a valuable sign. The purpose of my letter, Sir, is to make a plea for the inclusion of a plain skull radiological examination in the general physical examination of cases suspected of having an intracranial expanding lesion. By this I mean that the radiographs should not only be taken but interpreted before lumbar puncture is even considered.

The warning given by Mr. Henderson and Dr. de Gutiérrez-Mahoney will, one hopes, save many unfortunate patients from the dangerous sequelae of lumbar puncture in certain circumstances. If the habit is also made of using a lateral radiograph of the skull as an adjunct to the ophthalmoscope not only will more patients be saved the danger of a pressure cone but more intracranial tumours will be diagnosed earlier.—I am, etc.,

London, W.1. J. W. D. BULL.

SIR,—Mr. W. R. Henderson and Dr. C. G. Gutiérrez-Mahoney (June 24, p. 1461) by collating, *inter alia*, the cerebrospinal fluid findings in otogenic abscesses of the brain have recorded useful otogenic data. It is doubtful whether many otologists will agree with their sweeping deductions that "lumbar puncture has little value in the diagnosis of abscess and it is often dangerous. . . . The danger attached to lumbar puncture should be carefully balanced against its limited diagnostic value."

I venture to express the opinion that in establishing the diagnosis of an otogenic brain abscess a timely spinal tap with pressure readings and a complete cell count remains of great value; that the danger of a properly conducted or adequately supervised spinal tap has been overrated; that, moreover, a series of taps at intervals of from four to seven days will yield information of paramount diagnostic importance, especially if it discloses (in view of its positive diagnostic significance) the "syndrome de discordance"; and that reliable pressure readings may be used to determine whether the suspected, or actually diagnosed, abscess is below or above the tentorium.

The otologist constantly confronted with the problem of diagnosing an intracranial complication should still retain his faith in the spinal tap with the pressure readings and complete cell count. This will enable an early diagnosis of an acute otogenic brain abscess to be established by the most direct means. The more devious, more delayed, and often more difficult paths may be left to those determined to eschew this useful diagnostic ancillary.

Persisting nuchal rigidity is the most constant and the earliest sign of an acute cerebellar or cerebral abscess of otogenic origin. An examination of the cerebrospinal fluid is the only means of assessing the precise significance of such nuchal rigidity. Where the spinal tap reveals minimal changes—for example, under 100 cells per c.mm., mainly lymphocytes—such nuchal rigidity must be interpreted in terms of such an abscess. In 40 out of 44 (i.e., 90%) cases of otogenic cerebellar abscess recorded in the recent literature, the cells in the cerebrospinal fluid numbered under 100. In my own eight consecutive cases the cell counts at the time the cerebellar abscess was first diagnosed were as follows:

Case 1:	Cells per c mm. . .	43 :	81% lymphocytes
„ 2:	„ „ „ . .	28 :	100% „
„ 3:	„ „ „ . .	311 :	19% „
„ 4:	„ „ „ . .	17 :	95% „
„ 5:	„ „ „ . .	14 :	90% „
„ 6:	„ „ „ . .	1,000 :	polymorphs
„ 7:	„ „ „ . .	16 :	100% lymphocytes
„ 8:	„ „ „ . .	18 :	20% „

A normal cerebrospinal fluid (one completely devoid of any cells—Neel, 1939) excludes the presence of a clinically suspected acute otogenic brain abscess. Where the pressure is below 200 mm. of water the suspected acute otogenic brain abscess is most likely cerebellar; when the pressure is above 300 mm. of water the abscess is invariably above the tentorium (*J. Laryng.*, 1942, **57**, 129, 225; ibid., 1948, **62**, 228).—I am, etc.,

London, W.1. N. ASHERSON.

Hodgkin's Disease and Pregnancy

SIR,—I have read with interest the correspondence on the subject of the effect of pregnancy in Hodgkin's disease, and would like to record two further cases which support the view of Dr. B. Jolles (May 13, p. 1142) and Dr. M. Hulbert (June 3, p. 1322) that this is not always deleterious.

Case 1.—A girl aged 17 was seen in 1941, when she gave a four-weeks history of a painless lump in the neck. There was then a mass, 3 in. (7.5 cm.) in diameter, in the supraclavicular region, and biopsy showed typical Hodgkin's disease. The gland regressed under *x*-ray treatment and she remained well until 1944. She then developed glands in the right axilla and along the border of the pectoral muscles. These again responded to irradiation. In 1945 she became pregnant, and was delivered in February, 1946. Three months later she went to live in America, where a second child was born in 1949. There has been no further recurrence, and both the patient and her children are well.

Case 2.—A woman aged 28 was seen in July, 1948, and gave a two-years history of a lump in the neck, followed later by swellings in the right axilla and chest wall. On examination there were large masses of glands in the right side of the neck, the right axilla, and the right infraclavicular region; there were smaller glands in the left axilla. Biopsy from the neck showed rather atypical Hodgkin's disease. The patient responded well to *x*-ray therapy, becoming clinically symptom-free. In October, 1949, she had a normal delivery of a baby, who was breast-fed. Up to the present date she is in excellent health.

Although each case must be considered on its merits, it seems that when the disease is not active at the time when pregnancy is diagnosed this may well be allowed to progress normally.—I am, etc.,

London, W.12. L. H. WALTER.

Obstetrical Anaesthesia

SIR,—Even at the risk of stirring up an ancient controversy and of rousing the "auld enemy," our very good friends from over the border, I feel that Professor T. N. A. Jeffcoate's statement (June 10, p. 1359), that "light chloroform anaesthesia has much to commend it for easy low-forceps delivery in domiciliary practice," calls for comment.

It might well be asked how many expert anaesthetists would choose to administer chloroform for any operative procedure during labour. Most of them have long ago abandoned it as an agent of far too great a toxicity, and yet the general practitioner is encouraged to use it for easy low-forceps delivery in domiciliary practice. How often can one be quite certain that low-forceps delivery is in fact going to be quite so easy, even after very careful examination?

In any case, there remains the inescapable fact that primary cardiac failure is notoriously associated with operative procedures during light chloroform anaesthesia, and this devastating event just does not occur with ether, "trilene," nitrous oxide, and the like. I would also venture to point out that in domiciliary practice it is at least doubtful whether the lithotomy position is best for all operative deliveries. Apart from the fact that one may be more skilled in the application of forceps in the left lateral position, this attitude of the patient (which often, with advantage, becomes semi-prone on an ordinary bed) has most distinct advantages in preventing the very real risk referred to by Professor Jeffcoate himself—that of inhalation asphyxia or pneumonia. Furthermore, where one is often working short-handed, it is a very real comfort to be able to feel that the patient's tongue is most unlikely to fall back under the anaesthetic and obstruct the respiration. After thirty years of general practice I would quite seriously recommend this position for forceps delivery as a procedure calculated to relieve the general practitioner from a source of anxiety by no means inconsiderable.—I am, etc.,

London, N.W.7. A. H. MORLEY.

Early Rising for Puerperal Women

SIR,—A certain amount of amplification of my article (April 22, p. 936) will dispel at least some of the "serious and unresolved doubts" expressed by Professor A. Bradford Hill (May 6, p. 1074).

(*a*) *Caesarean Section Cases.*—An error in cast, for which I am responsible, placed the caesarean section cases in the wrong category. It should have been explained that with the "unselective distribution" 12 of the caesarean section cases went to Ward C1 and six to Ward C2, but that it was decided that they should all be subjected to early rising. They thus form a group outside the experiment proper. A woman delivered by caesarean section is subject to some risk not faced by, and exempt from other risks faced by, a woman delivered per vias naturales. The number of caesarean section cases was small and no useful deductions could be drawn from such a series. It was therefore decided to subject them all to early rising and note the effects. Of these 18 women, four had mild puerperal morbidity, and one urinary infection; these were all mild infections and responded rapidly to chemotherapy, and in no instance did any complication prolong the stay in hospital. In the post-natal clinic two were found to have symptomless retroversions.

With regard to Professor Bradford Hill's suggestion that more tables should have been published, this was contemplated but

abandoned because of the very extensive tabular material which had been prepared. Further, as the conclusions reached from the present data were somewhat tentative it was felt that a publication of complete tabular material should await the collection of further evidence.

(*b*) *Set-up.*—The survey was carried out on all cases admitted during 1948. Pregnancy and labour were under the care of many clinicians. The puerperium and post-natal period were under the direct observation of the writer. Antenatal and labour records were carefully scrutinized to detect any factors which might have a bearing on the ultimate result. The only prevalent morbid condition was dental caries, and in all except one case this was rectified before labour. The exception was a woman who persistently refused treatment. Thirty-six hours after delivery she suddenly collapsed and died. Necropsy revealed uterine sepsis and bilateral tuberculous disease of the suprarenal bodies. All other factors occurred in such small numbers that they could not have influenced the final statistics. For instance, one C1P and two C2M cases were treated for pyelitis of pregnancy, but each had a spontaneous delivery and uneventful puerperium. Low forceps were used to terminate labour in two C1P and two C2P cases for foetal distress: one of the former was found to have a lacerated cervix and one of the latter failed to attend the post-natal clinic. Not being regarded as potentially infected, as instrumental delivery was entirely in the interest of the foetus, they were admitted to C. All women were instructed to attend the post-natal clinic, but 24% failed to do so. The usual excuses for not attending were that they lived too far away or felt so well that they considered it unnecessary.

(*c*) *Undefined Method of "Unselective Distribution."*—It has already been stressed that certain cases would not be suitable for admission to C. At the conclusion of labour the suitable women were transferred to C and it was endeavoured to admit alternate cases to C1 and C2. Occasionally one or other ward was full and so perhaps two or even three consecutive cases might be sent to one ward or the other. No one in the labour ward would have any indication whether any given case would be sent to C1 or C2 and no one preparing the next bed in C would have any prior knowledge of the woman to occupy it. With one exception, no mother or child was discharged from the ward unless in good condition. One C2M mother with inflamed external piles discharged herself against medical advice. In the post-natal clinic she was found to be in good condition. No analysis was made of the duration of the stay in hospital, to avoid giving the impression of increasing the ward turn-over. Furthermore, extraneous factors might influence this finding. A young primipara with comfortable home surroundings might be allowed out earlier than an elderly multipara with several young children and poor home conditions.

I am unable to confirm or deny Dr. Wheatley's suggestion about the lacerated cervix, although I think his explanation is unlikely (May 13, p. 1142). With regard to his further statements I would point out that the recently delivered woman has "stretched" but not sprained muscles and that consideration of prolapse was specifically excluded from the scope of my article. My above remarks about retroversion and stress incontinence would refute his suggestions. I trust that the reply to Professor Bradford Hill will allay the doubts of Dr. Robertson Bain (May 20, p. 1205).—I am, etc.,

Johannesburg, South Africa. ALLAN B. SWARBRECK.

Brachial Neuralgia

SIR,—Dr. W. M. Philip (April 29, p. 986) has emphasized how important in brachial neuralgia is the loss of the normal anterior convexity of the cervical spine. I feel, however, that the factors which contribute to it and to some other of the clinical features of the condition are more complex than he has indicated. It has long been appreciated that abnormalities of spinal curvature may be produced by severe spinal root and cord lesions, but the effects of minor lesions have been rather neglected. Yet every spinal root innervates important muscles on which the spine depends for its integrity and normal functioning. Moreover, when part of the spine itself is damaged—and the disk is a part of the spine—further complexities are introduced. I offer the following additional points to explain some of the clinical findings involved:

(1) Prolapse of the disk allows the approximation of two vertebral bodies, which the disk previously separated.

(2) Active stretching of muscles and ligaments may have been produced at the same time that an injury, if any, occurred.

(3) Distortion of root filaments, roots, meninges, and even slightly of the cord, develops because of a new local relationship in length between these structures and their skeletal, muscular, and ligamentous supports.

(4) Damage to roots will damage some muscles on which the spine depends for its integrity and correct movement. Thus a lesion of C5 and C6 roots is sooner or later followed by weakness of muscles which include the scaleni—especially the anterior—longissimus capitis, splenius cervicis, semispinalis cervicis, neighbouring multifidus spinae, interspinales, and intertransversarii. Normally these muscles, when acting bilaterally, help to maintain the cervical anterior convexity. When they are weakened unilaterally, abnormal rotation and, secondarily, contralateral root involvement result. Persistent activity of neck muscles innervated at higher levels (including the sternomastoids, recti capitis anteriores and laterales, and upper fibres of longi colli, pulls the skull base and upper cervical vertebrae forwards. At the site of the initial lesion hypermobility—albeit rarely exceeding 2 millimetres in extent—antero-posteriorly, lateral, and rotatory develops. As the result of all these factors the vulnerable root filaments and the vertebral plexuses prior to their entrance into the foramina are irritated and crushed during movement.

Because many patients are only seen during acute phases when much spasm exists, many observers imagine that such spasm is always present to prevent the hypermobility. But tetanic spasm cannot persist indefinitely, because damage to nerve fibres and exhaustion of muscle would inevitably supervene. Moreover, this hypermobility may be effective during sleep; people often sleep with the head and neck strangely twisted and with the shoulder on the pillow. In such a position abnormal stresses, especially of the lowest fibres of longus colli, eventually produce a kyphoscoliosis in the region of the second to the fourth dorsal vertebrae. Delpech (*L'Orthomorphie*, 1828, **2**, 10. Paris, Gabon) considered that incipient scoliosis in this area might be associated with submammary neuralgia. The more recent work of Inman and Saunders (*J. nerv. ment. Dis.*, 1944, **99**, 660), and my own personal experience, favour the view that submammary neuralgia can be referred to deep structures innervated by C7 and C8 roots. A diagnosis of cardiac disease is more likely to be made when the chest and arm pain is associated with displacement of the cardiac apex by the scoliosis.

Costoclavicular Compression.—A lesion of C4 and C5 roots weakens the shoulder girdle musculature and may result later—secondarily—in costoclavicular compression. Hence the complex picture of both root and brachial plexus lesions so often seen. In these cases one should carefully investigate the anatomical relations of the fourth cervical vertebra, especially its related intervertebral foramina.

Scalenus Anticus Syndrome.—I suggest two possible causes for this "syndrome": (1) A lesion of C7 which weakens the scalenus medius and posterior and allows most of the weight of the first rib to be borne by the scalenus anterior, which may then hypertrophy; (2) An irritative lesion of C5 and C6 which may cause spasm and later fibrosis of the scalenus anterior itself.

I have often produced considerable if temporary alleviation of symptoms by lifting the head vertically and pressing the two bones above the vertebra prominens forward. This manœuvre helps to regain the cervical anterior convexity and may reduce the slight listhesis present. Lateral displacement or persistent rotation is not so easily overcome. Using similar anatomical principles in the treatment of sciatica, I have also seen improvement result from instructing the patient to lie on his back with a small pillow or rolled towel under the lumbar spine (especially if the bed sags or the buttocks are rather fat). But prolonged extension and fixation alone by the physician, while reducing the pressure on the root filaments and venous plexuses and preventing movement against them, may perpetuate and aggravate the excessive length of soft supporting structures and later allow recurrences to develop with less strain each time. On the other hand, Nature's best method of preventing movement is by the production of extensive osteophytes around the contiguous margins of the vertebral bodies, and it is then that one can truly say that large numbers of osteophytes may exist without pain.

Research into the problems of brachial neuralgia and its many closely related phenomena can be really fruitful only when it is customary to dissect and study the normal deep structures of the cervical region in great detail. Furthermore, this region is the great nodal area for structures which are clinically and anatomically parts of the head and neck, thorax, and upper limb. I therefore suggest that every attempt should be made to dissect this area as a composite whole. Moreover, it should be borne in mind that radiographs—which show hard structures only—are usually taken of a spine which is artificially kept immobile; but in life the spine, just as the sun in Gibeon, only rarely stands still.—I am, etc.,

London, N.7. I. H. MILNER.

Scarlet Fever, Rheumatic Fever, and Acute Nephritis

Sir,—Dr. T. W. Buchan has suggested (May 27, p. 1268) that I might have access to morbidity figures of acute nephritis which could be compared with those of scarlet fever and acute rheumatism. These figures are not in fact normally shown in the Air Ministry's annual *Statistics on the Health of the R.A.F. and W.A.A.F.* In this publication nephritis is classified as "all types." However, the medical statistical department of the Medical Directorate-General were able to break this down. Table I shows the result. None of these figures has previously been available. They should be read with the tables in my paper of April 29 (p. 992).

TABLE I.—*Incidence of Acute Nephritis in R.A.F. at Home and W.A.A.F. at Home: 1938–47*

Year	R.A.F. at Home				W.A.A.F. at Home			
	No. of Cases	No. of Deaths	Incidence per 1,000 of Strength	Average No. of Days' Treatment	No. of Cases	No. of Deaths	Incidence per 1,000 of Strength	Average No. of Days' Treatment
1938	22	0	0·34	68	0	0	0	0
1939	48	1	0·38	48	0	0	0	0
1940	88	0	0·30	43	0	0	0	0
1941	142	3	0·24	32	12	0	0·25	36
1942	108	7	0·17	31	81	2	0·64	22
1943	57	4	0·08	47	13	0	0·07	31
1944	130	7	0·13	30	17	0	0·10	28
1945	93	4	0·14	25	13	1	0·10	59
1946	69	2	0·20	48	7	1	0·14	44
1947	41	2	0·17	26	5	0	0·22	19

Figs. 1 and 2 demonstrate the relationship of the three diseases being considered over ten years in the R.A.F. and W.A.A.F.

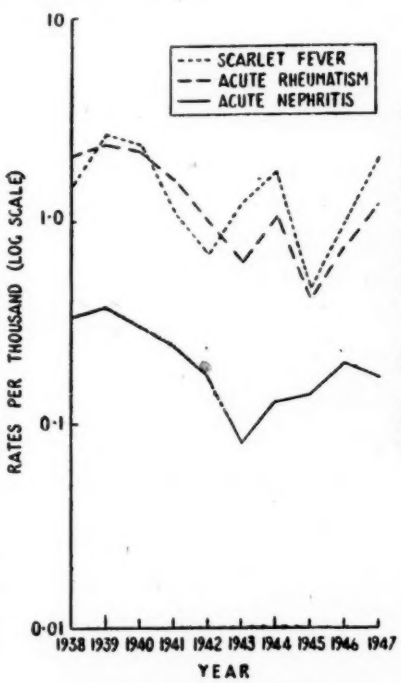


FIG. 1.—Incidence of scarlet fever, acute rheumatism, and acute nephritis in the R.A.F.

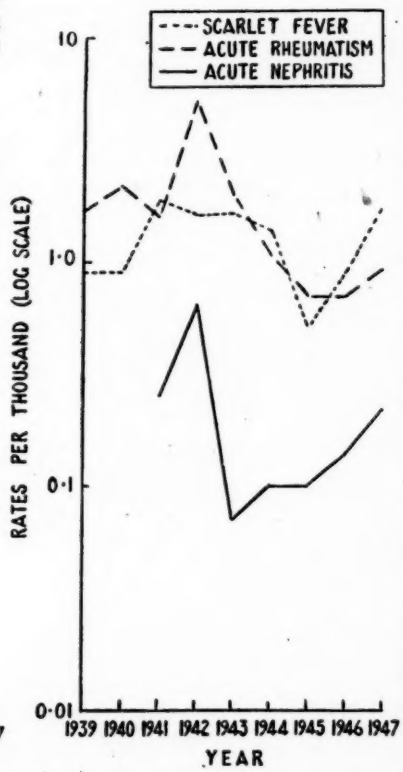


FIG. 2.—Incidence of scarlet fever, acute rheumatism, and acute nephritis in the W.A.A.F.

The coefficient of correlation can be calculated for the available rates per thousand using R.A.F. figures only:

	r
Scarlet fever and acute rheumatism	+0·83
Scarlet fever and acute nephritis	+0·61
Acute rheumatism and acute nephritis	+0·91

Fisher gives the figure of 0.632 as lower limit of significance when the number of observations is ten. It is felt that it is reasonable to consider the relationship to be established.

I do not consider it worth while calculating coefficients for the female population. The force was not stable. It expanded quickly and the rate of influx and egress was high.

Dr. Buchan asks if he can be supplied with the average duration of fatal cases of these diseases. The Medical Statistical Department are preparing an accurate record of these over a period of years and will publish this in due course.—I am, etc.,

T. C. MACDONALD,
Wing Commander, Royal Air Force.

Harrow-on-the-Hill, Middlesex.

Treatment of Tropical Ulcers

SIR,—Everybody who has had to deal with tropical ulcer as a medical and social problem must be grateful to Dr. T. C. Hallinan (May 13, p. 1118) for his interesting memorandum. Coming to St. Vincent early in 1949, I found a large number of cases of tropical ulcer, and, feeling that the disease might be closely related to malnutrition, I started to treat it as a vitamin deficiency, prescribing as a standard treatment ½ oz. (15 ml.) of cod-liver oil, 1 dr. (4 g.) of "Fleischmann dry yeast," and approximately ½ oz. of lime squash a day. With that treatment I failed to achieve any reasonably quick improvement in healing, so since January, 1950, I have modified it by adding local treatment. My procedure now is as follows:

For 24 to 48 hours I apply fomentation with any disinfectant having lytic properties against dead tissue ("dettol," "eusol," etc., in high concentration). Obtaining a reasonably clear surface, I fill the ulcer cavity with blood, taken by a 10–20-ml. syringe from a vein, until the surface is covered by a strong clot. It is of the first importance to form a good strong clot on the borders of the ulcer, as there the granulation is to be started. I leave the clot undressed. To prevent secondary infection it is advisable, however, to cover the ulcer with gauze similar to that used for babies after smallpox vaccination. The procedure is repeated at approximately weekly intervals on the places not yet showing granulation, the last stage being to inject fresh blood into the newly formed skin and tissue, and apply ung. zinci morrhuatis *B.P.* on the area not yet covered by skin.

I have used this treatment in 15 cases, obtaining a cure in all of them. The average healing-time was two to three weeks in ulcers ½–2 in. (1.25–5 cm.) in diameter and four to five weeks in larger ones; the average number of applications was five to six in the latter. The Kahn-positive cases are undergoing arsenic and bismuth treatment simultaneously.

It is obvious that, in treatment of ulcers, induction of the granulation process is of outstanding importance. In the above-mentioned approach the mechanism seems to be: First, the artificially induced clot is a "ready-made" ground for scarification; secondly, increased local and general assistance is given to germs through the proteinotherapeutic action of induced blood (modification of autohaemotherapy); thirdly, the supply of vitamins to the organism. The process seems to work well, though in one of the cases treated overgranulation occurred, which I was obliged to treat with 20% of silver nitrate.

The following summary of a case is typical of the procedure employed.

A male labourer aged 34 was admitted to the District Hospital, St. Vincent, on January 3, 1950. He had been suffering from ulcers for four years. These had been resistant to all treatment, arsenic and bismuth included. Two years ago the left leg had been amputated above the knee because of destructive deep ulcers. The right leg was badly swollen, with two ulcers—7 in. by 4 in. (17.5 by 12 cm.) and 2in. by 3 in. (5 by 8 cm.), and 1 to 1½ in. (2.5 to 3.8 cm.) deep—connected by a narrow channel. After two days' fomentation with dettol solution 20 ml. of jelly-like blood was placed on the surface of the ulcers.

After five applications the smaller ulcer had closed. The larger ulcer was covered with new skin with the exception of an area of under-granulation 1 in. in diameter. To this new tissue 10 ml. of blood was applied and a dressing with ung. zinci morrhuatis *B.P.* In six and a half weeks cure was complete, and four and a half months later there had been no relapse.

I believe that this procedure shortens the time of treatment of ulcers considerably; it can be carried out at the patient's home or in the out-patient department, and it is cheap. Perhaps this record may stimulate further experimentation in better conditions and with better facilities.—I am, etc.,

St. Vincent, B.W.I. M. ZWIERZ.

Blood Loss at Operation

SIR,—Dr. John Marchant's letter (June 17, p. 1431) is valuable because it suggests a rough-and-ready method by which the surgeon or his theatre staff can estimate a patient's blood loss, but more valuable still is the implication that this is the proper approach to transfusion during operation—the replacement of the lost blood, neither more nor less.

Some surgeons take pride in using no blood because they feel that to do so would reflect upon their haemostatic technique; some, like Dr. Marchant, transfuse according to an estimate of the amount lost; others, who hold that transfusion is a good treatment for all types of shock, transfuse blood vigorously whenever there is any drop in blood pressure, regardless of haemorrhage or not. There is a need for a careful investigation into the effect of transfusion in those operations where shock occurs in the absence of significant loss of blood or plasma from the circulation. Experience with battle casualties and in obstetrics has convinced many that transfusion under such circumstances is valueless. Some surgeons and anaesthetists must have material in their records (covering the periods before and since transfusion came to be used so readily) which they could analyse for us in order to discover whether transfusion is any help in "surgical shock" *not* due to haemorrhage.—I am, etc.,

Dublin. EARLE HACKETT.

Medical Administration in the Tropics

SIR,—We were very interested to read Dr. George McLean's article on medical administration in the Tropics (April 1, p. 756), and to compare his experiences in East Africa with our own on the West Coast. His remarks about leprosy were of particular concern to us, working as we do in a leper colony, but their significance is much wider and deeper than this single disease, as leprosy has the habit of underlining beliefs about disease in general. Concerning Hansen's disease, therefore, we would like to express our observations on two points, witchcraft and leprophobia.

As in the East so in the West, the local people believe that a witch invoking the evil spirits can "ill-wish" leprosy on his enemies. At the same time, however, they do recognize that leprosy is a contagious disease and isolate in a separate house in the compound any advanced case. It is difficult to follow their line of reasoning in holding two such apparently contrary notions, but perhaps they reckon that witchcraft brings about its end by natural means, in this case by contact with a leper. However, they have not elaborated any argument, they simply hold the two ideas. Secondly, we have noted that our only cases of leprophobia are among the educated sophisticated section of the native community, whereas the men from the bush bear the most mutilating disease with courage, calm resignation, and even gaiety.

Certain conclusions of wide implication may be deduced from these few simple observations. Native beliefs are not always an obstacle to new factual knowledge, but rather should the latter complement the former and not try to supplant it, otherwise the friction of which Dr. McLean makes such delicate mention is likely to arise. And, secondly, it is certainly wise, as Dr. McLean suggests, to undertake a study of the social anthropology and psychiatry of native peoples before they are subjected to any "gigantic health education scheme," otherwise the end-result will be the replacement of malaria by neurosis. It is even possible that in the course of such a study the European may learn that the anxious fear of a disease is worse than the disease itself, and that prevention can be worse than cure.—We are, etc.,

Ogoja Leper Settlement, S. Nigeria. E. J. and I. BARNES.

Separation of Umbilical Cord before Delivery

SIR,—I wonder if the following case is sufficiently rare to be worthy of note? I have certainly never seen such a case myself among thousands of deliveries. It is a case in which the cord had evidently separated from the umbilicus *in utero*, probably about three weeks before delivery, and both the umbilical scar and the end of the cord were completely fibrosed at birth.

The patient was Chinese, aged 28, and this was her second pregnancy; the first ended with a forceps delivery of a stillborn baby. Due date May 23, 1950.

Antenatal Examinations.—First seen on February 28, 1950, when foetal heart sounds were heard. On second and third visits no heart sounds were heard, but the abdomen was much larger—in fact, at the last visit the size was about that of a full-term pregnancy, but the presentation was difficult to determine owing to tenseness of abdomen.

Description of Labour.—Patient admitted on April 2, with os three-quarters dilated, membranes bulging, and the presenting part high. The abdomen was very tense and it was difficult to feel the foetal parts. Hydramnios was diagnosed. When the membranes ruptured a large quantity of liquor amnii escaped. The foetus was expelled as a breech with extended legs. It was a macerated male foetus, but with no cord attached to its umbilicus. No cord was visible until after a further escape of liquor, when it appeared at the vulva, and the placenta was delivered normally ten minutes later. Both the umbilical scar and the end of the cord were completely healed and fibrosed.

The Kahn test was positive in this case, and the question arises, Could this be a case of thrombosis of the vessels at the umbilicus due to syphilis? There was no history of fall or injury, and external version had not been attempted at the antenatal clinic. Also there was no trace of blood in the amniotic fluid.—I am, etc.,

Hong Kong, China. ANNIE SYDENHAM.

Nocturnal Enuresis

SIR,—With reference to your annotation (June 10, p. 1357), you may be interested to know that my father, the late Dr. F. R. Sinton, of Leeds, designed, built, and used an almost identical apparatus for use in enuresis in 1916. He gave it up, however, as he found, as you suggest, that most of his cases became used to the bell before they were cured, and also that the bell awoke the mother or father, who preferred to change the bedding, which was wet in any case, in the morning rather than during the night. For these reasons he found its use in general practice was not worth the candle. It appears most suitable in institutions with their increasing compulsions.—I am, etc.,

Leeds. ALASTAIR SINTON.

Some Effects of Polarized Light On Vision

SIR,—Professor H. Hartridge (June 10, p. 1331) has pointed out the difficulty of reconciling the perception of polarized light by the bee with the classical explanations of Haidinger's brushes. We have shown recently,[1] however, that the latter are best explained as being due to the dichroic action of orientated blue receptors of the retina rather than to any more anterior structures: presumably, therefore, the bee possesses dichroic orientated receptors. These need not necessarily be blue receptors, since the bee is capable of appreciating ultra-violet light. There is, indeed, evidence[2] of a peak in its luminosity curve at about 365 mμ as there is in the photo-sensitivity curve of visual purple[3]: this peak, in fact, may be as much as four or five times as high as the peak in the visible spectrum. A remarkably high percentage of the intensity of daylight is due to ultraviolet light even in towns, where it amounts on an average throughout the year[4] to about 10%. Since the polarization of the light from the sky is due

to scattering, which is inversely proportional to the fourth power of the wavelength, the ultra-violet light is likely to be relatively highly polarized.

Professor Hartridge also tends to overestimate the superiority of the bee in appreciating the direction of polarization. Haidinger's brushes can be seen in the sky by many people without a polarizer, even in thin cloud, and Tschermak-Seysenegg[5] states that under favourable conditions an estimate of the plane of polarization can be made with a precision of 5 degrees or less. In the less favourable conditions which usually obtain in Manchester we have been able to do this frequently with an accuracy of 10 degrees. Thorpe[6] states that under good conditions the accuracy of the direction given by the bee is about 3 degrees: but in this case the bee may be using the observed direction of the sun in addition to the polarized light of the sky.—We are, etc.,

A. STANWORTH.
E. J. NAYLOR.

Manchester.

REFERENCES

1 *Brit. J. Ophthal.*, 1950, **34**, 282.
2 Bertholf, L. M., *J. Agric. Res.*, 1931, **43**, 703.
3 Goodeve, C. F., Lythgoe, R. J., and Schneider, E. E., *Proc. roy. Soc.* Series B., *Biol. Sci.*, 1942, **130**, 380.
4 Ashworth, J. R., *Ultra-Violet and Daylight Rays in the Solar Cycle*, 1949. University Press of Liverpool.
5 *Docum. ophthal.*, 1948, **2**, 10.
6 *Nature, Lond.*, 1949, **164**, 11.

Treatment of Obesity

SIR,—In my letter in the *Journal* of May 20 (p. 1204) I was more concerned with the futility of many of the prevalent concomitant restrictions in the treatment of obesity than with the treatment itself, but Dr. Josiah Oldfield (June 17, p. 1437) is correct in most of his assumptions. I did not claim to reduce a patient 20 lb. (9 kg.) in 2–3 months, but stated that it was not uncommon for my patients to lose a stone (6.3 kg.) in three weeks or even two. My last patient in fact lost 20 lb. in the first three weeks and was able to discontinue treatment after four weeks. I do not usually take longer than six weeks on a case. I regard strict adherence to diet as essential in any kind of treatment of obesity no matter how simple the restrictions. In that sense my treatment consists of "rigid dieting." But, since the patient can eat as much as he likes of the foods that are permitted, perhaps these words are not so appropriate.

Since my letter appears to have excited some inquiry and interest, perhaps you will be good enough to allow me the space in which to set forth as briefly as I can the principle on which I work. I claim no discovery, in fact nothing beyond the intelligent application of known facts.

The broad principle is simple enough. All carbohydrate and fat is forbidden and unlimited quantities of the remaining protein and "cellular" foods are allowed. From these (and this is where many seem so incredulous) a diet of unlimited quantity and good variety can be prepared. The system brings into full play the much neglected but very valuable specific dynamic action of protein, and the results are safe, swift, and sure. I submit two specimen full-scale dinners in support of my contention that this is no starvation diet. Helpings may be as large as the patient's appetite dictates.

Hors d'œuvres ..	Grapefruit	Lettuce, tomato, cucumber, slices of pickled or salt herring
Soup	Bouillon	Thick soup (thickened with vegetable purée or egg)
Fish	Boiled salmon and cucumber	Baked cod and tomatoes
Entrée	Roast chicken; salad	Cold meat; salad
Sweet	Stewed rhubarb (sweetened with saccharin)	Jelly; orange
	Coffee	Coffee

I need hardly emphasize that attention to details and the preparation of proper well-cooked meals are essential, and although I cannot enter into important minutiae here I willingly offer them to any medical man who wishes to come and read them, or I will even read a paper on the subject to any interested group. I use no adjuvant treatments, but permit "dexedrine" if my patients want it. They usually stop using this after the first three to four days.—I am, etc.,

A. LEWIS.

London, W.9.

Obituary

W. R. DAWSON, O.B.E., M.D., F.R.C.P.I.

Dr. W. R. Dawson, who was for seven years the Chief Medical Officer of the Ministry of Home Affairs, Northern Ireland, died in a nursing-home at Swindon on June 17 at the age of 85.

William Richard Dawson was born at Stramore, Co. Down, on September 11, 1864, and educated at the Royal School, Dungannon, and at Trinity College, Dublin. He graduated M.B., B.Ch., B.A.O. in 1890, proceeding M.D. a year later. He was elected F.R.C.P.I. in 1899 and he took the D.P.H. in 1907. At intervals during this period he continued his postgraduate studies at Edinburgh and in Berlin and Vienna. He won the Stewart Scholarship in Mental Diseases in 1895, and a year later was awarded the certificate of the Medico-Psychological Association of Great Britain and Ireland (later the Royal Medico-Psychological Association) and the Gaskell Prize. He early specialized in the study of mental disease, and he joined the staff of the Royal Edinburgh Asylum in 1894. He returned to Dublin five years later as medical superintendent of Farnham House. It was then that Dr. Dawson began to build up his reputation, and in 1906 he was appointed an investigator for the Royal Commission on the Feeble-minded. He became inspector of asylums in Ireland in 1911, and in the same year was elected president of the Medico-Psychological Society of Great Britain and Ireland. During the 1914–18 war Dr. Dawson served in the R.A.M.C. with the rank of lieutenant-colonel. Not long after demobilization he became co-editor of the *Journal of Mental Science*. It was after the Irish Treaty that he was appointed in 1922 Chief Medical Officer of the Ministry of Home Affairs, a post from which he retired in 1929.

Dr. Dawson was the author of a number of papers and books on his special subject, and he was responsible for the translation from the German of other works. He was particularly interested in alcoholism and mental disorders and in the geographical distribution of cases of mental disease in relation to social and occupational factors. His early work for the Royal Commission stimulated his interest in the care and education of mentally defective children. Dr. Dawson had been a member of the British Medical Association for many years, and he was vice-president of the Section of Psychological Medicine at the Annual Meeting in 1909. He married in 1898 Florence, daughter of the late R. W. Shekleton, Q.C.

Dr. WILLIAM INGRAM GORDON, who was in practice for thirty-seven years at Blyth, Northumberland, died at his home in Morpeth, Northumberland, on May 17 at the age of 66. He was the second son of the Reverend Robert Gordon and was born at Pluscardyn, Morayshire, on March 31, 1884. He was educated at Elgin Academy and Aberdeen University, where he graduated M.B., Ch.B. in 1907. Dr. Gordon came to Blyth in 1911 and succeeded the late Dr. J. Crombie two years later. From that time onwards he continued in practice until his retirement in 1948. He was appointed a J.P. in 1930 and from 1925 to 1934 was a member of the Northumberland County Council. He was secretary of the Blyth Division of the B.M.A. from 1922 to 1927, and chairman of the division in 1932–3 and again in 1938–9. Dr. Gordon also represented the division at the annual meetings in Aberdeen in 1939 and in 1941, 1942, and 1944 in London. In 1935 he joined the world tour and attended the Melbourne meeting. A popular and well-known figure at Blyth, he had a number of local interests, such as chairmanship of the Boy

Scouts' Association. When he came to live in the Morpeth area he was made an elder of St. George's Presbyterian Church. In 1914 he married Frances Eva, daughter of the late Alderman S. W. Swan, J.P., a former mayor of Sunderland. His widow and four children, two boys and two girls, survive him. Gordon was a sound practitioner of the old school, thorough in his work, which he always kept up to date, and he worked hard and played hard. He was a kindly man, a good friend, and a perfect host. A keen tennis player and golfer, he was captain of the Blyth Golf Club, but his greatest interest was in bridge, for which he had a rare talent. Dr. Gordon died of the "doctor's complaint," angina pectoris. He suffered greatly during the last few years of his life, but at all times he bore his illness with great courage.—T. J. R.

Dr. ARTHUR DE WINTON SNOWDEN died suddenly in Bournemouth on May 20. He was born on September 12, 1872, and was the son of Prebendary J. H. Snowden, vicar of St. Paul's, Hammersmith. He was educated at St. Paul's School, Christ's College, Cambridge, and St. George's Hospital. At Cambridge he was captain of his college boat club, rowed in the "trial eights," and just missed rowing in the Oxford and Cambridge boat-race. Soon after qualifying M.R.C.S., L.R.C.P. in 1897 he developed symptoms of chest trouble, and went out to South Africa as resident medical officer at Grahamstown Hospital, Cape Colony. At the outbreak of the South African war he served as honorary major in charge of a medical section and was awarded the Queen's Medal, with four bars. After his return to England he graduated M.B., B.Ch. in 1902, proceeding M.D. in 1905. Further symptoms then appeared, and he went to Nordrach-upon-Mendip Sanatorium, first as a patient and afterwards as medical officer. He then took up an appointment at Mundesley Sanatorium and worked in close collaboration with the late Sidney V. Pearson. In the 1914–18 war he served as major in charge of the medical section of the Red Cross Hospital at Netley. For this service he was appointed C.B.E. After the war he purchased and developed the Linford Sanatorium at Ringwood in the New Forest, where he carried on a most useful and successful practice. Dr. Snowden had been a member of the British Medical Association for many years and was vice-president of the Section of Tuberculosis at the Annual Meeting of the Association in 1927 and vice-president of the Section of Public Health in 1934. On his retirement he settled in Bournemouth. He will long be remembered by a large number of appreciative and grateful patients, and sadly missed by a diminishing number of old friends. These regrets will be shared by all young children of his acquaintance. With them he was always at his best. He married Miss E. C. Drummond, daughter of Captain Cecil Drummond, Enderby Hall, Leicester. She died in 1941. His only son, born in 1912, survives him.—R. H. L., N. F. A., F. J. C.

Dr. KENNETH CECIL LAWRENCE PADDLE died suddenly at his home in Botleys Park, Chertsey, Surrey, on May 24, at the age of 55. He was born in Mauritius, where his father was the medical superintendent of the mental hospital. He came to England in 1916, joined the Royal Artillery, and was awarded the Military Cross in France. On demobilization he studied medicine at St. Bartholomew's Hospital, qualifying in 1924. Paddle was early attracted to psychiatry and was appointed a senior medical officer at the West Riding Mental Hospital, Wakefield, where he came under the influence of the late Professor John Shaw Bolton. The value of this firm foundation to his training was well shown in his later clinical, pathological, and administrative work. In 1929 he became deputy medical superintendent of St. Lawrence's Hospital, Caterham. Here he studied mental deficiency very thoroughly and investigated the epidemiology of asylum dysentery and the incidence of congenital syphilis in an institution with a population of 2,000 defectives. He wrote valuable articles on the use of an autogenous vaccine in dysentery, on the incidence and treatment of congenital syphilis in defectives, and on lumbar puncture. Dr. Paddle was appointed physician superintendent of Botleys Park Hospital, Chertsey, under the Surrey County Council, in 1937. Here he laboured exceedingly on all aspects of mental deficiency, an unpopular subject at the best of times. He showed himself to be an able administrator and a sound psychiatrist. Botleys Park became an E.M.S. hospital during the war, and he was appointed medical superintendent of the whole organization, a task which he shouldered without faltering. The successful conduct of this hospital and the excellent work now being carried out at Botleys Park are due to his quiet but forceful leadership. There can be little doubt, however, that the strain of the war years, during which he had a severe abdominal illness, took a toll of his health which he never revealed. Dr. Paddle had numerous interests outside his work. He had a most charming manner and was always ready to lend assistance to a good cause. He leaves a widow, two sons, and a daughter, and his own mother also survives him. His elder son is Dr. Kenneth G. Paddle, who qualified in 1944 from St. Thomas's Hospital. His daughter is a nurse at St. Bartholomew's Hospital, and the younger son is still at school. —D. M.

Mr. DAVIS WOODCOCK DANIELS, of Mansfield, died on May 24 at the age of 65. The sixth son of Edward Daniels, of Leicester, he was educated at Wyggeston Grammar School, Leicester, where he obtained an open natural science scholarship to St. Mary's Hospital, London. As a student he won both junior and senior anatomy prizes, as well as prizes for operative and practical surgery, and the Meadowes memorial prize in gynaecology. He qualified in 1907 with the conjoint diploma and in the same year graduated M.B., B.S. In 1910 he took the F.R.C.S. and proceeded M.D., being awarded the gold medal for midwifery. After completing appointments as out-patient surgeon, house-surgeon, and resident casualty surgeon at his teaching hospital, as senior house-surgeon at the Royal Cancer Hospital, and finally as surgical registrar at the Prince of Wales's Hospital, Mr. Daniels went into general practice with the late Dr. G. T. D. Elder, of Mansfield. He became honorary surgeon to the Mansfield General Hospital, and this appointment he held until his retirement from the staff, when he was appointed consulting surgeon. He joined the R.A.M.C. in December, 1915, and served with the B.E.F. as a specialist surgical officer with charge of the surgical division of No. 3 Stationary Hospital until 1919. He was an examiner for the General Nursing Council, a medical referee under the Workmen's Compensation Acts for the Nottingham and Derby county courts, and he held many appointments under the Ministry of Health, Ministry of Labour, and Ministry of Pensions. Mr. Daniels was a member of the Nottingham Medico-Chirurgical Society, and chairman of the Nottinghamshire Local Medical Committee. He was first vice-president and later president of the Nottinghamshire Collieries' Medical Service Association, and he was the author of a number of papers on surgical subjects. Mr. Daniels was outwardly somewhat reserved, but his sensitive and conscientious temperament was probably best appreciated by his patients and his personal friends.—N. F. B.

Dr. ALBERT EDWARD PHILLIPS, of Pinner, Middlesex, died on June 9 at the early age of 51. He was educated at Kingstown Grammar School and was a student at Trinity College, Dublin, where he graduated M.B., B.Ch., B.A.O. in 1922. He played hockey for Ireland on a number of occasions. Dr. Phillips joined the Royal Navy and rose to the rank of commander before retiring. During one period of his service he was employed on deep-sea diving experiments under the direction of Professor Haldane. Dr. Phillips settled in Pinner in 1939, joining a firm of local practitioners which afterwards dissolved partnership. From then onwards, up to the time of his death, he conducted his own practice. He worked hard and never spared himself in giving of his best to all his patients. To those who knew him well it seemed that the long hours he worked and the little leisure he allowed himself were at least in some measure responsible for his untimely death from coronary thrombosis. He had earned the respect of his many patients and all the people of Pinner, and his death will be mourned by many colleagues and friends.—N. P. J.

Medical Notes in Parliament

Restriction of Medical List in Northern Ireland

In the Northern Ireland Senate last week Mr. BROWNE asked the leader of the House whether he had seen a report of a meeting of the Northern Ireland Branch of the British Medical Association on June 4, 1950, at which a resolution was passed requesting the Minister of Health and Local Government to limit the number of general practitioners on the list of the Northern Ireland Health Services Board. Did this request indicate that there were too many medical practitioners in Northern Ireland? Did the Government intend to accede to this request and, if so, what was to become of the students at Queen's University who might obtain their medical degrees? Were they supposed to take up private practice or to find employment outside Northern Ireland; and was there any intention on the part of the Government to retire those on the Board's list at the age of 65?

Sir ROLAND NUGENT replied: "The Northern Ireland Branch of the British Medical Association forwarded to the Minister of Health and Local Government the resolution referred to, proposing the closure for the present of the medical list of the Northern Ireland General Health Services Board and at the same time intimated that the Negotiating Committee of the general practitioners' section of the Branch would wish to discuss with the Ministry the question of permanent arrangements for restriction of entry to the list."

Protection Against Smallpox

In the House of Lords on June 23 Lord MORRISON, replying for the Government to a question by Lord Clydesmuir about the need for improved measures against smallpox, announced that new instructions had been circulated to Scottish hospitals that week and were being prepared for issue to hospitals in England and Wales.

Lord CLYDESMUIR recalled the recent outbreak in Glasgow, and asked for compulsory vaccination of fever hospital staffs. He pointed out that, of the 18 confirmed cases, only six had no vaccination scars, and all of these patients died. Altogether half a million people were vaccinated in the Glasgow outbreak, but that should not have been necessary. The protection should have been nearer the source of the infection. His plea was supported by Lord AMULREE and Lord HADEN-GUEST.

Lord MORRISON said that the National Health Service Act had repealed the provisions governing the compulsory vaccination of children. The Government did not think it right to impose by administrative action a restriction on the liberty of prospective nurses when it did not apply to the rest of the community. Such a condition might well affect recruiting, and would certainly be an obstacle to the recruitment of hospital domestic staffs. After consultation with local authorities and medical officers of health, centralized instructions to hospitals had been laid down on the following lines. In all hospitals where the staff was likely to be exposed to special risk, including general and children's hospitals, all recruits to the staff would be offered vaccination unless they presented clear evidence of having been very recently vaccinated. Existing staff would be offered revaccination from time to time, and at least once every three years. There might, he said, have to be some modification of these instructions for transient employees, working in hospitals for only a short time and not in contact with patients, but these would be the only exceptions.

Experience showed that staffs whose duties brought them into contact with patients were very unlikely to refuse vaccination, especially as care would be taken to present the offer suitably and to make convenient arrangements to carry out the vaccination without delay. It would be rare for a nurse to decline to be vaccinated. If such a case did arise the hospital authorities would arrange for her to be employed on duties where the risk of contact was reduced to a minimum.

All hospitals would be required to compile up-to-date records showing the vaccination position of each member of their staffs. The object of this was to ensure that prompt and effective action could be taken as soon as any case of contact with smallpox entered hospital. When this happened, vaccination or revaccination would be offered immediately to members of the staff, and at the same time their vaccination record would be examined with a view to removing from any risk of contact anyone not protected. This would apply not only to nurses but to domestic staff, ambulance attendants, and anyone else in the hospital exposed to risk of contact.

Hospitals designated for the treatment of smallpox patients were in a special category. As a rule their staffs must be protected by periodic vaccination. They were normally volunteers, engaged on the understanding that their vaccination state was maintained. It was normal practice for nurses to be immunized against diphtheria, typhoid, and paratyphoid; against tuberculosis, inoculation with B.C.G. was offered in appropriate cases. The Government believed that this new routine, already accepted as good hospital practice, would reduce the risks to a minimum when extended to all hospitals.

Agene and Peptic Ulcer

Dr. BARNET STROSS asked the Minister of Food on June 19 how soon would all flour treated by some form of improver be so treated that the agene process could be forbidden; and whether he could estimate the cost in dollars for machinery and chlorine dioxide, which must be imported from the United States.

Mr. MAURICE WEBB said it would take about two years to complete this change. The dollar cost would probably be about 337,000 United States dollars.

Dr. STROSS said there was a considerable body of medical opinion that believed peptic ulceration was aggravated by the agene process, and that this had been responsible for the increase of duodenal and gastric ulcers within recent years. He asked for an assurance that as soon as possible we should be free from this somewhat poisonous improver.

Mr. WEBB repeated that the change-over would take two years.

Claims for Industrial Injury

Dr. BARNET STROSS asked the Minister of National Insurance on June 20 by what means a workman, insured under the Industrial Injuries Act, who was unable to appeal against a provisional assessment within two years of its being made, could obtain information as to the reasons for the findings of the medical board; and whether she was aware that, in some case of industrial injury, medical boards made a provisional assessment coupled with an estimation of loss of faculty, termed offset, or not due to the injury itself; and whether she would give instructions that in every such case a full diagnosis be given to the injured workman or his trade union representative.

Dr. EDITH SUMMERSKILL said that under the regulations claimants for disablement benefit received written summaries of the medical boards' findings. Subject to a few exceptions made on medical advice in the claimant's own interest, these summaries should include the diagnosis of abnormal conditions, whether or not they were caused or made worse by the accident.

Dr. STROSS said the answer was very helpful, but pointed out that there were cases where these provisional assessments were made and during the two years information was refused to the injured workman or his trade union advisers.

Dr. SUMMERSKILL replied that she was not aware of that, but thought she could undertake, if Dr. Stross had any case in mind, for the summaries which were given in the initial stage to be amplified, so that no information was withheld from any man who was anxious to have it.

Quarantine Certificates

Major HOWARD JOHNSON asked the Minister of National Insurance on June 20 whether she was aware that a certificate given by a general medical practitioner placing a person in quarantine could not be accepted for a benefit claim; and, in view of the fact that this cast a slur upon the practitioner, whether she would take the steps necessary to amend the National

Insurance (Unemployment and Sickness Benefit) Regulations in this respect.

Dr. EDITH SUMMERSKILL said that the medical officer of health was responsible for action to prevent the spread of infectious disease, and it was in accordance with the recommendation of the National Insurance Advisory Committee that he was also the authority for the issue of insurance certificates in these cases. This implied no slur on general practitioners, and she saw no reason to alter the present provision.

Major JOHNSON said that when persons were placed in quarantine they were supposed to isolate themselves. Was it wise to require such persons to travel all over the town, probably by public transport, to locate the local medical officer?

Dr. SUMMERSKILL said that when an individual was in quarantine in a household there must be a person in the same house who was suffering from an infectious disease. The sequence of events was this: the individual suffering from the infectious disease obtained a certificate in the first place, and a nurse probably called at the house within the next 48 hours. As the medical officer of health had to certify the condition for the sake of the person in quarantine, it was quite possible for him to obtain a certificate from the medical officer who called to see the patient.

Major JOHNSON then asked the Minister to see that something was done to facilitate the obtaining of the certificate from the medical officer of health, because persons were having difficulty in finding the local medical officer. He was satisfied with the Minister's explanation of why it was necessary.

Dr. SUMMERSKILL said the person who knew where to get in touch with the M.O.H. was the general practitioner, and he told the patient who was suffering from the infectious disease, and the patient then told his relative.

Health of Troops in Malaya

The health of the troops in Malaya and the medical services available to them were among the subjects raised when Mr. GRIFFITHS and Mr. STRACHEY made statements to the House of Commons on June 21 on their recent tour in the Far East. The Secretary of State for War said that the strain of conducting these toilsome operations was not a light one, but was being borne with admirable cheerfulness. The health of the troops was excellent. The medical authorities assured him that, taking one thing with another, the sickness rate was below rather than above that of troops in the United Kingdom.

Col. STODDART-SCOTT asked if additional medical personnel had arrived, and whether the Minister was satisfied that an adequate service was being provided.

Mr. STRACHEY said he had looked into that matter very carefully. He thought the supply of specialists in Malaya was completely satisfactory. He found no hospital or unit which felt it was short of specialists, although it was true to say that in some cases they were short of general-practitioner establishment. For example, the base hospital at Singapore was short of general practitioners, in the sense that they were below establishment. There were quite enough practitioners to cope with the work in hand now, and no man was suffering for lack of general-practitioner attention. However, he would like to get the number up a bit towards establishment in case the present wonderful health record of the troops did not continue quite as well. The difficulty of getting general practitioners at the moment would be appreciated, but they were sending more out.

Col. GOMME-DUNCAN asked if the medical units "in this war area" were actually on a mobilized footing.

Mr. STRACHEY said he could not answer the question technically without notice, because there was no state of war in Malaya in the legal sense of the words. The units were thoroughly well found in equipment and thoroughly adequate to their task. One anxiety he felt was to get a rather larger number of general practitioners.

Mr. MOTT-RADCLYFFE inquired about helicopters, and Mr. STRACHEY said three had arrived. It was an interesting development, and he thought they might prove very useful in the jungle. They had not yet been used to bring wounded men out of the jungle, but it was hoped to find an opportunity of doing that in the near future.

Absenteeism in Royal Ordnance Factories

Major GUY LLOYD asked the Minister of Supply on June 19 what was the total to date of days of work lost each month to all the Royal Ordnance factories since the sick pay scheme was introduced.

Mr. GEORGE STRAUSS said that the sick leave scheme provided for the issue of full ordinary time-rate pay less the amount of any National Insurance benefit. The following table showed the total number of working days lost each month through sickness in all Royal Ordnance factories since the introduction of the Industrial Paid Sick Leave Scheme in September, 1948.

	1948–9		1949–50	
	(a) Total Working Days	(b) No. of Working Days Lost	(a) Total Working Days	(b) No. of Working Days Lost
September	660,840	24,224	742,740	32,458
October	876,230	44,739	919,800	46,585
November	702,000	42,326	730,560	37,805
December	886,525	54,328	902,400	45,809
January	716,880	44,722	705,800	38,815
February	722,240	58,431	676,740	43,525
March	730,700	65,578	660,060	48,800
April	916,200	64,857	808,250	46,841
May	734,980	42,808	633,960	34,444
June	736,540	36,155		
July	920,250	36,677		
August	740,000	29,003		

Major LLOYD also asked the Minister how many cases of Royal Ordnance factory workers taking up spare-time work while on sick pay had been reported to him since the inception of the sick pay scheme, and how many cases of malingering had been reported to him.

Mr. STRAUSS said that 30 cases of employees taking other employment during sick absence had been reported. Of these, 20 were substantiated and disciplinary action taken. Two cases were under examination. Paid sick leave was conditional on the production of medical certificates. Disciplinary action had been taken in 26 cases where behaviour during sick absence was incompatible with unfitness for employment or likely to retard recovery.

Advertising Vacancies

Sir HUGH LUCAS-TOOTH asked the Minister of Health on June 22 what was the cost of advertising in the Press for vacancies on hospital staffs. Mr. BEVAN replied that the total cost during 1949–50 for all non-teaching hospitals in England and Wales was approximately £500,000.

Sir HUGH LUCAS-TOOTH said was this not a very large sum to pay to newspaper proprietors? Was the Minister not aware that in many cases these advertisements were almost duplications of one another, with perhaps one word changed?

Mr. BEVAN said he had already called the attention of regional hospital boards to his view that this was an excessive sum. It must be remembered that when the Service was being built up very large numbers of additional domestic servants were being recruited for the hospitals and that advertising was necessary for that purpose.

Consultant and S.H.M.O. Grades

Mr. OLIVER asked the Minister of Health on June 22 whether he was aware that doctors who were refused consultant status and graded as senior medical officers under the National Health Act had been compelled, in order to obtain posts carrying consultant status, to leave their hospitals and go to others, and that the vacancies thus created had been advertised and filled not by doctors graded as senior medical officers but by consultants; and whether this practice had his approval.

Mr. BEVAN said that during this transitional period some posts graded for consultants were inevitably held by individuals who had been graded only as senior hospital medical officers. It must, of course, always be open to these officers to seek advertised consultant appointments at their own or other hospitals, if they thought they were likely to qualify for them.

Mr. OLIVER asked if the Minister appreciated that it caused a great deal of unnecessary hardship if doctors had to move to obtain a status in which they ought to have been graded in the first place.

Mr. BEVAN said, on the contrary, it would cause considerable hardship if a doctor who had already been graded as a senior medical officer could never have a chance of being re-graded as a consultant.

Parliamentary Medical Group

A meeting of the all-party medical group of members of Parliament was held on June 21. The following officers were elected: Chairman, Lord Haden-Guest; Vice-chairman and Treasurer, Mr. Hugh Linstead, M.P.; Honorary Secretary, A. D. D. Broughton, M.P.

Public Health Advisers in Germany.—Mr. YOUNGER, Minister of State, stated in reply to Mr. ALBU on June 21 that the present number on the staff of the Public Health Adviser to the United Kingdom High Commissioner in Germany was ten. This number would be reduced to seven in July and four on January 1, 1951. The Public Health Adviser was responsible for liaison with the German authorities on the many questions which arose concerning the public health of the Allied Forces. He advised the United Kingdom High Commissioner on health matters and on co-operation with the United States and French public health officials on questions with a tripartite, federal, or international aspect.

Medico-Legal

VESTING OF MATERNITY HOME IN THE MINISTER

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

In 1924 the Wellington Urban District Council set up a maternity home. The wide powers conferred on local authorities by the Local Government Act, 1929, not being available then, it did so by instituting a charitable trust. This conveyed to trustees, on trust, land on which to erect the home, with power to let, mortgage, pull down, and alter the premises as they thought fit. It also empowered the trustees to apply all moneys arising from a sale, mortgage, or other disposition of the premises either for the purposes of the home or for such other charitable purposes as they should think fit. In 1926 the Council conveyed certain funds to the trustees by way of endowment, directing them to apply the income towards the maintenance and management of the home and to invest the surplus, and, when they thought fit, to sell the investments and apply the proceeds for such other charitable purposes as they should think fit. On July 5, 1948, when the National Health Service came into operation, the premises were being used as a maternity home and the endowments were being applied for that purpose.

Section 6 (1) of the National Health Service Act, 1946, provides that on the appointed day there shall be transferred to and vested in the Minister all interests in or attaching to premises forming part of a voluntary hospital held by trustees solely for the purposes of that hospital. Section 7 (4, 10) makes a similar provision concerning endowments. The Minister accordingly claimed to take over the home, but the trustees objected on the ground that they did not hold the premises and funds solely for the purposes of the hospital, because they had discretion to apply them to other charitable purposes.

The trustees contended that, as the Act had an expropriating effect, it should be construed strictly and the court should look to the provisions of the trust deeds. The Minister, on the other hand, held that the Act should be construed liberally, in order to enable him to carry out the functions given to him, and that the matter was one of fact, to be determined by the actual use of the premises and funds at the vesting date. Mr. Justice Wynn Parry, trying the action,[1] thought that the proper course was simply to discover the intention of Parliament from the language used in the Act. Both contentions, he said, had much to commend them, so that an ambiguity arose. He decided, however, that the language of the sections could not bear the construction put upon them by the trustees, and that he must look at the actual position at the moment the Act came into force. Accordingly he made a declaration that the home and its endowments were vested in the Minister under the Act.

[1] *The Times*, April 26, 1950.

Universities and Colleges

UNIVERSITY OF EDINBURGH

Professor H. de Watteville, professor of obstetrics and gynaecology in the University of Geneva, will deliver a lecture on "The Clinical Use of Hormone Assays in the Urine" in the obstetrics lecture theatre, 60, George Square, Edinburgh, on Tuesday, July 4, at 5 p.m. Senior students and graduates in medicine are invited to attend the lecture.

UNIVERSITY OF LONDON

Mr. John B. Hunter has been appointed Deputy Vice-Chancellor for the year 1950–1.

The following scholarships at the Royal Free Hospital School of Medicine have been awarded for 1950–1: *Isabel Thorne Scholarship*, Miss J. H. Weston, Haslingden Grammar School (£40 per annum for six years); *Mabel Sharman-Crawford Scholarship*, Miss R. Turner, North London Collegiate School and Acton Technical College (£40 per annum for four years); *Sir Owen Roberts Memorial Scholarship*, Miss P. Painter, Royal Free Hospital School of Medicine (£65 per annum for four years); *A. M. Bird Scholarship for Clinical Studies*, Miss A. Curry, Royal Free Hospital School of Medicine (£40 per annum for three years).

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The following lectures will be delivered at the College (Lincoln's Inn Fields, London, W.C.): July 6, 5 p.m., Otolaryngology Lecture by Sir Gordon Gordon-Taylor, "Glands in the Neck"; July 13, 5 p.m., Surgery Lecture by Dr. Gunnar Bauer, Surgeon-in-Chief, Mariestad Hospital, Sweden, "The Diagnosis and Treatment of Acute Deep Venous Thrombosis"; July 14, 3.45 p.m., Charles Tomes Lecture by Professor Lester Cahn, Professor of Oral Pathology, Columbia University, "The Jaws in Generalized Skeletal Disease"; July 14, 5 p.m., Charles Tomes Lecture by Professor A. B. P. Amies, Dean of the Faculty of Dental Science, University of Melbourne, "Epulides." The lectures are open to those attending courses in the College and to all other medical practitioners, dental surgeons, and advanced students.

UNIVERSITY OF BIRMINGHAM

Sir Leonard G. Parsons, M.D., F.R.C.P., F.R.C.O.G., F.R.S., has been appointed representative of the University at the 150th anniversary of the incorporation of the Royal College of Surgeons of England this month, and Dr. C. N. Iland representative at the International Congress for Microbiology to be held at Rio de Janeiro in August.

Colin White, M.Sc., M.B., B.S., has been appointed Lecturer in Physiology from September 1.

The Services

A *Supplement* to the *London Gazette* has announced the following awards:

Territorial Efficiency Decoration with 1st Clasp.—Colonel J. M. Smellie, O.B.E., Lieutenant-Colonels T. W. Preston and R. L. Turner, O.B.E., Major D. P. Holmes, Captain T. F. Jouning, R.A.M.C.

Territorial Efficiency Decoration.—Lieutenant-Colonel W. R. Blunt, Lieutenant-Colonel (Honorary Colonel) E. Bulmer, C.B.E., Majors (Honorary Lieutenant-Colonels), J. McL. Cobban, H. E. W. Waters, Major (Temporary Lieutenant-Colonel) W Gibson, Majors (Acting Lieutenant-Colonels) F. J. Manning, O. G. Prosser, M.C., A. Willcox, Majors R. Barraclough, M.B.E., E. H. Hanson, N. G. G. Talbot, O.B.E., Captains (Honorary Majors) A. S. Anderson, J. A. R. Johnson, P. M. Lissack, D. W. E. Lloyd, M.C., M. Park, G. Punshon, D. E. Ross, Captain J. K. Sugden, R.A.M.C.

No. 23

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended June 10.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1950 (a)	(b)	(c)	(d)	(e)	1949 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Meningococcal infection	42	5	18	2	2	27	1	14	3	—
Deaths		—	—				1	1		
Diphtheria	73	6	9	—	1	93	9	40	1	4
Deaths	—	—	—	—	—	3	1	—	—	—
Dysentery	353	22	134	2	2	99	7	48	—	1
Deaths					—				—	—
Encephalitis, acute	5	—	—		—	—	—	—	—	—
Deaths		1		—			—			
Erysipelas			13	10	3			27	7	2
Deaths							—			
Infective enteritis or diarrhoea under 2 years				19					34	
Deaths	22		2	2	1	20	3	4	—	—
Measles*	10,712	613	960	291	118	9,773	1083	457	236	172
Deaths†		—	—	—	—			—	2	—
Ophthalmia neonatorum	47	5	11		—	28	1	7	1	—
Deaths										
Paratyphoid fever	7	1	1 (B)		—	7	1	—	2 (B)	—
Deaths	—		—		—	—	—	—	—	—
Pneumonia, influenzal	480	23	4	—	6	493	23	6	5	5
Deaths (from influenza)‡	9	—	2	1	—	15	—	—	—	—
Pneumonia, primary			170	¶				180	27	
Deaths	186	20		7	4	140	22		4	3
Poliomyelitis, acute	79	6	8	1	8	13	1	5	—	—
Deaths§	7	—		—		—	—			
Puerperal fever		—	9				—	7		
Deaths										
Puerperal pyrexia‖	84	1	7	—	2	85	7	2	—	—
Deaths							—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	846	62	140	55	49	1,242	90	174	72	36
Deaths†			—	—	—			—	—	—
Smallpox	—	—	—		—	—	—	—	—	—
Deaths					—				—	—
Typhoid fever	9	1	1	1	2	4	—	—	—	1
Deaths	1	1	—		—	—	—	—	—	—
Typhus fever	1	—	—	—	—	—	—	—	—	—
Deaths					—	—			—	—
Whooping-cough	3,437	168	358	135	49	2,178	111	129	164	73
Deaths	5	—	2	—	—	6	1	1	2	—
Deaths (0–1 year)	239	33	37	14	13	254	34	33	21	9
Deaths (excluding still-births)	4,779	731	584	144	125	4,505	671	562	159	101
Annual death rate (per 1,000 persons living)			11·7					11·3	9·9	
Live births	7,951	1269	928	362	209	7,607	1268	1008	464	245
Annual rate per 1,000 persons living			18·6					202	288	
Stillbirths	177	24	32			190	25	30		
Rate per 1,000 total births (including stillborn)			33					29		

* Measles is not notifiable in Scotland, and the returns are therefore an approximation only.

† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.

‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.

‖ Includes puerperal fever for England and Wales and Eire.

¶ Primary pneumonia no longer notifiable in Eire.

EPIDEMIOLOGICAL NOTES

Poliomyelitis in England and Wales

In the twenty-fourth week, ended June 17, there were 93 (79) notifications of poliomyelitis: 77 (61) paralytic cases and 16 (18) non-paralytic cases. The figures for the previous week are shown in parentheses. Although the upward trend continues, the recent rise is less steep than that which preceded the twenty-third week. The main concentration of cases continues to be in the Midlands, and 28 (20) of the 77 paralytic cases were notified in Birmingham C.B., where there has been a total of 65 cases in the past four weeks. If these Warwickshire notifications can be discounted, the figures for the rest of the country do not yet suggest the beginning of a phenomenal rise.

Discussion of Table

In *England and Wales* there were increases in the notifications of whooping-cough 824, measles 637, and acute poliomyelitis 42, with decreases in the incidence of scarlet fever 312 and dysentery 101.

The largest increases in the notifications of whooping-cough were: Yorkshire West Riding 123, Lancashire 60, Gloucestershire 51, and Southampton 51. The largest rises in the incidence of measles were: Lancashire 147, London 135, Lincolnshire 125, Cheshire 109, Yorkshire West Riding 103, and Essex 92; the chief exceptions to the general rise in incidence were decreases in Norfolk 193, Suffolk 84, and Durham 80. A small decline in the incidence of scarlet fever occurred in most areas; the largest fall was in Lancashire 56.

The chief features of the local returns of diphtheria were an increase of 7 in Durham and 8 notifications in Kent (Orpington U.D. 7). There had been no notifications of diphtheria in Kent for the preceding 10 weeks.

There is still a high incidence of dysentery. The largest returns were: Lancashire 98 (Oldham C.B. 35, Preston C.B. 12, Rawtenstall M.B. 12, Manchester C.B. 7), Yorkshire West Riding 88 (Bradford C.B. 29, Sheffield C.B. 17, Dewsbury C.B. 12, Leeds C.B. 7, Wortley R.D. 7), Durham 34 (Stanley U.D. 10, South Shields C.B. 9, Whickham U.D. 7), London 22 (Southwark 12), Surrey 16, Nottinghamshire 13 (Worksop R.D. 6), and Hertfordshire 10 (Elstree R.D. 10).

In *Scotland* decreases were recorded in the notifications of measles 20, diphtheria 12, and scarlet fever 11. There was a rise in the incidence of whooping-cough 23.

Notifications of diphtheria were the lowest ever recorded. There were 8 cases of poliomyelitis notified. 5 more than in the preceding week. The only areas with 2 cases of poliomyelitis were the cities of Glasgow and Dundee.

In *Eire* there were increases in the notifications of whooping-cough 60 and measles 41, with a decrease in the incidence of scarlet fever 17. A rise of 35 was reported in the notifications of measles in Dublin C.B. Whooping-cough was generally more prevalent; the largest outbreaks during the week were: Kilkenny (Castlecomer R.D 27) and Donegal (Lirishower R.D. 13), and a rise of 13 was recorded in Dublin C.B.

In *Northern Ireland* the only change in the trends of infectious diseases was a decrease of 54 in the notifications of measles; the largest fall was 25 in Londonderry county. Of the 8 cases of poliomyelitis 4 were notified in Belfast C.B.

Week Ending June 17

Notifications of infectious diseases in England and Wales during the week included: scarlet fever 850, whooping-cough 3,649, diphtheria 51, measles 8,857, acute pneumonia 431, acute poliomyelitis 93, dysentery 351, paratyphoid fever 9, and typhoid fever 6.

The Bristol Hospitals Fund has received £100 from the Lord Mayor's Voluntary Services Fund towards the purchase of a third unit for the Bristol Physiotherapy Service. The Hospital Fund is pledged to raise subscriptions for the unit (about £550) this year, and so far £194 has been received. The unit is needed to provide physiotherapy for patients at home, a service not available under the N.H.S.

Medical News

Royal Institute of Public Health and Hygiene

The Royal Institute of Public Health and Hygiene has announced that courses of instruction will commence, both whole-time and part-time, as follows: Certificate in Public Health and Diploma in Industrial Health (Part 1), October 6, 1950; Diploma in Public Health (for those holding the C.P.H.), August 4, 1950; Diploma in Industrial Health (Part 2), July 7, 1950. Prospectuses, enrolment forms, and full details may be obtained from the secretary of the Institute, 28, Portland Place, London, W.1 (Telephone: Langham 2731–2).

Ulster Paediatric Society

The annual general meeting of the Ulster Paediatric Society was held on April 12, when Dr. Robert Marshall was unanimously elected chairman. The first meeting of the year was held on June 15 at the Royal Belfast Hospital for Sick Children. Mr. Denis Browne spoke on "The Aetiology and Treatment of Congenital Malformations." His talk was much appreciated by a large attendance of members and guests.

Royal Statistical Society

At the 116th Annual General Meeting of the Royal Statistical Society the following elections were announced: President, Professor A. Bradford Hill; Honorary Secretaries: Mr. R. F. George, Mr. Richard Stone, Mr. Philip Lyle; Honorary Treasurer, Mr. R. F. Fowler. Mr. H. Campion, of the Central Statistical Office, was awarded the Society's Guy Medal in silver.

Society of Chiropodists

The annual dinner of the Society of Chiropodists was held in the Park Lane Hotel on June 23, with the president, Mr. John H. Hanby, in the chair. In proposing the health of the society, Lord Webb-Johnson recalled the early days when the society had sought the help of the Royal College of Surgeons in its effort to establish chiropody as a profession. He urged upon them close collaboration with the other medical auxiliaries. The chiropodists had set up standards and had a code of ethics. Their work on children, Lord Webb-Johnson believed, would be the greatest thing they could do in the future. The position they had attained had been achieved by wise leadership, and in this connexion he mentioned in particular the hard work done by Mr. E. G. V. Runting. In reply the president, Mr. Hanby, said that the chiropodists were now a national body and were represented on a new Whitley Council of the National Health Service. He referred to the petition to the House of Commons recently presented on behalf of the society against a private Bill which coupled their name without their consent. Another proposed Bill was trying to by-pass the Cope Committee. When the findings of the Cope Committee had been accepted they would achieve much that they had been fighting for for many years. The health of the guests was proposed by the vice-president of the society, Miss C. F. Norrie. She mentioned in particular Mr. Norman C. Lake, who had been the first practising surgeon to lecture to students of chiropody; and she, too, referred appreciatively to pioneer work done by Mr. Runting. The toast of the guests was responded to in a short and witty speech by Sir Horace Evans.

Presentation

Testimony to the work of Dr. T. C. Graves, who has retired after 30 years as medical superintendent of Rubery Hill Hospital, was paid at a ceremony at the hospital on June 15. In the presence of members of the group management committee and professional colleagues Dr. Graves was presented with an illuminated album and a gold watch. Mr. D. Rhydderch, chairman of the committee, said that honour was due to Dr. Graves for the fact that, despite qualifications which would have enabled him to take up a more remunerative career, he had carried out his great work at the hospital and made a fundamental contribution to the understanding of mental health. Other speakers included Dr. J. F. Brailsford and Mr. H. H. Sampson.

North-east London Clinical Society

The annual dinner of the society—the first since the war—was held on June 7. Dr. Brian Russell was in the chair and proposed a toast to the society, with the hope that after the many vicissitudes through which it had gone in the past it had now entered a new and long lease of life. Dr. D. B. Handley replied, and emphasized that the strength of such societies was dependent on the support of the general practitioners. Mr. A. Dickson Wright delivered a witty address on "The History of Quackery." He outlined some of the forces which fostered and maintained quackery even in contemporary society, and emphasized the necessity for self-criticism among the profession when confronted by phenomena that still remain unsolved. Mr. Ralph Coyte proposed a vote of thanks to the guest speaker.

Unesco Book Coupons

Two more countries, Burma and Belgium, have recently joined the Unesco Book Coupon scheme. Individuals and institutions in "soft currency" countries may obtain these coupons in order to buy books or periodicals more easily from "hard currency" countries. The coupons have a dollar face value, and may be obtained in England with sterling from Unesco Book Coupons, Book Tokens, Limited, 28, Little Russell Street, London, W.C.1. The following countries are now co-operating in the scheme: Burma, Belgium, Czechoslovakia, Egypt, France, Hungary, India, Israel, Italy, Netherlands, Switzerland, United Kingdom (including British Colonial and Trust Territories), and U.S.A.

COMING EVENTS

Middlesex County Medical Society

The John Tate Lecture for 1950 will be delivered by Sir Alexander Fleming, F.R.S., at the Edgware General Hospital on Tuesday, July 18, at 5 p.m. His subject is "Success."

Edinburgh Lectures

In connexion with the postgraduate course in the medical sciences the Edinburgh Postgraduate Board for Medicine has arranged a series of open lectures starting on Tuesday, July 11, in the Anatomy Lecture Theatre, Edinburgh University, New Buildings. Details will be published under "Societies and Lectures" in the *Journal*.

Congress of Ophthalmology

The Sixteenth International Congress of Ophthalmology, to be held in London on July 17–22, will include an exhibition of industrial and social ophthalmology. It will be staged at the London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1. Medical practitioners are invited to visit the exhibition on Friday, July 21 (9.30 a.m. to 6 p.m.), and Saturday, July 22 (9.30 a.m. to 1 p.m.). The exhibition will cover the following subjects: books on industrial ophthalmology and industrial medicine; the education of management and workers in the principles of accident prevention; eye protection; colour vision; the use of optical devices in close work; first-aid and subsequent treatment of industrial eye injuries; miners' nystagmus; the fitting and manufacture of artificial eyes; methods of manufacture and fitting of contact lenses; the care of the blind, and the welfare, rehabilitation, training, and employment of the blind.

International Dental Congress

The eleventh International Dental Congress of the Fédération Dentaire Internationale will take place in London on July 19–26, 1952, under the presidency of Dr. E. Wilfred Fish. During the week there will be discussions every morning introduced by the authors of papers which will have been published in the new *International Dental Journal* for this purpose. This journal will be produced quarterly under the editorship of Professor H. H. Stones, of the University of Liverpool. The subscription will be £2 5s. a year, single copies 12s. 6d. Published by Messrs. Cassell and Co., Ltd., the first issue will appear next September. Dental practitioners who wish to attend or to contribute to any of the sections of the congress should write to the honorary secretary, Mr. G. H. Leatherman, 13, Hill Street, London, W.1.

British Association of Allergists

The ninth general meeting of the British Association of Allergists will be held at the Sir William Dunn School of Pathology, South Parks Road, Oxford, on Saturday, July 8. The programme is as follows: 10 a.m., council meeting; 11.50 a.m., Dr. A. W. Frankland, "First European Congress of Allergy"; 12 noon, paper by Drs. Homer E. Prince and Richard L. Etter, "Histamine Therapy," to be presented by Dr. Prince (Houston, Texas, U.S.A.) and discussion to be opened by Dr. Blair Macaulay; 2.30 p.m., Dr. Boen Swinny (San Antonio, Texas), "Viral Allergy," followed by a general discussion; 3.15 p.m., Dr. E. A. Brown (Boston, Mass., U.S.A.), "Present Status of A.C.T.H. Therapy in the Allergic Diseases," discussion to be opened by Dr. Peter Bishop.

Renal Association

A special meeting of the Renal Association will be held at the Ciba Foundation, 41, Portland Place, London, W., on Saturday, July 15, at 11.30 a.m. to welcome Dr. Homer Smith. He will give an address entitled "Development of Modern Renal Physiology." A few seats will be available to non-members and tickets may be obtained from the secretary, Mr. John Sophian, 66, Harley Street, London, W.1.

Royal Medico-Psychological Association

The annual meeting of the Royal Medico-Psychological Association will be held at the County Rooms, Hotel Street, Leicester. On Wednesday, July 12, at 2.30 p.m., Dr. K. K. Drury will be inducted as president for the ensuing year and will deliver an address. The annual dinner of the association will be held at Carlton Hayes Hospital, Narborough, Leicester, the same day at 7.30 for 8 p.m.

Sheffield Regional Consultants and Specialists

The annual general meeting of all consultants and specialists of the Sheffield Region will be held at Pearson House, Nottingham General Hospital, on Saturday, July 8, at 3 p.m.

1952 Congress of Dermatology

The Tenth International Congress of Dermatology will be held in London during the summer of 1952 under the presidency of Sir Archibald Gray. A preliminary programme will be prepared this year. As a result of the disruption caused by the last war addresses of the secretaries of certain dermatological societies are not available, so that all those interested are asked to communicate with Dr. Gordon B. Mitchell-Heggs, general secretary, Institute of Dermatology, St. John's Hospital for Diseases of the Skin, Lisle Street, Leicester Square, London, W.C.2.

Society for Epileptics

A meeting will be held on Thursday, July 6, at 5.30 p.m. at the Royal Society of Medicine, 1, Wimpole Street, London, W.1, to inaugurate a laymen's society to further the interests of those suffering from epilepsy. Lady Cynthia Colville will preside, and the business of the meeting will be to discuss the objects of the proposed society, to appoint a council, and adopt a name. The proposed association is being formed under the auspices, but independently, of the National Association for Mental Health, and is receiving support and encouragement from the British Branch of the International League against Epilepsy. Those who have promised to speak include Dr. Russell Brain, Dr. Macdonald Critchley, Dr. Letitia Fairfield, and Dr. Denis Williams, in addition to several lay speakers. It is hoped that the association may be regarded as a memorial to the late Dr. Tylor Fox, who was warmly interested in the scheme. Its main object is "to enable persons suffering from epilepsy to lead as normal a life as possible in society and to educate the public into a rational and sympathetic attitude towards epileptics in all spheres of life, and to enlist the help of people and bodies to bring this about."

Association of Clinical Pathologists

The Association of Clinical Pathologists will hold its summer meeting in the Medical School, University of Leeds, on July 20, 21, and 22.

SOCIETIES AND LECTURES

A fee is charged for attending lectures marked ●. Application should be made first to the institution concerned.

Tuesday

EDINBURGH UNIVERSITY.—At Obstetrics Lecture Theatre, 60, George Square, Edinburgh, July 4, 5 p.m., "*The Clinical Use of Hormone Assays in the Urine*," by Professor H. de Watteville (University of Geneva).

Wednesday

YORKSHIRE SOCIETY OF ANAESTHETISTS.—At the General Infirmary at Leeds, July 5, 8 p.m., "*Common Factors in Diabetes, Anaesthesia, and Shock*," by Dr. A. H. Galley.

Thursday

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—July 6, 5 p.m., "*Glands in the Neck*," Otolaryngology Lecture by Sir Gordon Gordon-Taylor.

ROYAL SANITARY INSTITUTE.—At Newark-on-Trent, July 6, 10.30 a.m., papers: "*Hygiene in Communal Feeding*," by Mr. A. H. Walters; "*Rural Planning*," by Mr. R. A. Kidd, B.Sc., M.I.C.E. Afternoon: visits will be made.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—At 26, Portland Place, London, W., July 6, 7.30 p.m., "*Story of Smallpox in the British Isles*," by Lieutenant-General Sir William MacArthur, K.C.B.

Friday

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, London, W.—July 7, 8 p.m., "*The Measurement of X and Gamma Radiation over a Wide Energy Range*," Twenty-ninth Silvanus Thompson Memorial Lecture by Dr. Lauriston S. Taylor (Washington, U.S.A.).

MAIDA VALE HOSPITAL FOR NERVOUS DISEASES MEDICAL SCHOOL, Maida Vale, London, W.—July 7, 5 p.m., clinical-neurological demonstration by Mr. Valentine Logue.

Saturday

BRITISH ASSOCIATION OF ALLERGISTS.—At Sir William Dunn School of Pathology, South Parks Road, Oxford, July 8, 10 a.m., council meeting; 11.50 a.m., "*First European Congress of Allergy*," by Dr. A. W. Frankland; 12 noon, "*Histamine Therapy*," by Drs. Homer E. Prince and Richard L. Etter; 2.30 p.m., "*Viral Allergy*," by Dr. Boen Swinny; 3.15 p.m., "*Present Status of A.C.T.H. Therapy in the Allergic Diseases*," by Dr. E. A. Brown.

SOUTH-EAST METROPOLITAN REGIONAL TUBERCULOSIS SOCIETY.—At Darvell Hall Sanatorium, Robertsbridge, Sussex, July 8, 10.30 for 11 a.m., "*A Record of Lucite Ball Plombage*," by Mr. W. P. Cleland; "*Domiciliary Chemotherapy*," by Dr. B. Rigden; "*Primary Tuberculosis*," by Dr. Ruth Dingley; demonstration of cases by Dr. A. McFarlane.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Harper.—On June 23, 1950, at Gara, Needham Market, Suffolk, to Sybil (formerly Dyson), wife of Dr. James Harper, a brother for Christine, Peter, and Mary.

Kendall.—On May 31, 1950, at the Radcliffe Infirmary, Oxford, to Hilda Mary (formerly Morgan), M.B., Ch.B., wife of A. C. Kendall, M.R.C.P., a son.

Wolfson.—On May 26, 1950, at Birmingham Maternity Hospital, to Nancy, wife of Dr. L. J. Wolfson, a daughter.

MARRIAGE

Terajewicz—Lewandowska.—On June 7, 1950, at the District Register Office, Bury, Lancs, Walerian Terajewicz, M.D., to Aniela Lewandowska.

DEATHS

Brown.—On June 21, 1950, at The Cedars, Westgate Bay Avenue, Westgate-on-Sea, Alexander Warwick Brown, D.Sc., M.B., C.M.

Dawson.—On June 17, 1950, at a Swindon nursing-home, William Richard Dawson, O.B.E., M.D., F.R.C.P.I., Lieutenant-Colonel, R.A.M.C., retired, aged 85.

Fitch.—On June 17, 1950, Edward Louis Vincent Fitch, M.R.C.S., L.R.C.P., of Cleator Gate, Cleator, Cumberland, aged 36.

Gauld.—On June 16, 1950, at 7, Park Terrace, Nottingham, George Ogg Gauld, M.B., Ch.B., aged 76.

Gray.—On June 16, 1950, in London, George Munn Gray, M.D., F.R.C.S., of Penryn, Cornwall, late of Nigeria.

Haughton.—On June 11, 1950, at Truro, John Welby Haughton, L.R.C.P.& S.I., formerly of Falmouth, aged 84.

King.—On June 22, 1950, William Athol Desmond King, M.R.C.S., L.R.C.P., D.P.H., of 1, Bishop's Place, Paignton, Devon.

McAlpine.—On June 11, 1950, at Leicester, Kenneth McAlpine, M.B., Ch.B.

McGlade.—On June 20, 1950, at Belfast, Joseph Stanislaus McGlade, M.B., B.Ch., of Coleraine, Northern Ireland.

O'Brien.—On June 12, 1950, at Crickhowell Hospital, Charles Patrick O'Brien, M.R.C.S., L.R.C.P.

Quirke.—On June 22, 1950, at 494, Fulham Palace Road, London, S.W., John Joseph Quirke, M.R.C.S., L.R.C.P., aged 82.

Rowlands.—On June 18, 1950, Bernard Rowlands, L.S.A., late of Stanstead Road, Forest Hill, London, S.E.

Smith.—On June 22, 1950, at Hindhead, Surrey, Gilbert Smith, M.D., F.R.C.S., aged 75.

Thomas.—On June 21, 1950, in a London nursing-home, Harold Wynne Thomas, M.R.C.S., L.R.C.P., of Copley Dene, Sundridge Avenue, Bromley, Kent, aged 85.

Young.—On May 18, 1950, in London, Morris Youdelevitz Young, C.I.E., M.B., Ch.B., aged 68.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Angiocardiography

Q.—*What is the technique of angiocardiography? Can the coronary arteries be outlined by this means, and is it possible to detect changes in the lumen of these arteries—sclerosis, thrombosis, etc.? Is angiocardiography a dangerous procedure?*

A.—In angiocardiography a large volume (40 ml.) of 70% diodone is injected very rapidly into a peripheral vein. Serial pictures are taken as the contrast medium arrives in and leaves the right heart. Thereafter the dye reaches the left heart, having been further diluted in its passage through the lungs. At this stage, about six to eight seconds after injection, pictures of the left ventricle and aorta may be obtained. Owing to dilution of the dye, however, the coronary arteries remain invisible. New techniques are being developed for improved aortography. The contrast substance may be injected through a catheter passed through the right heart into the pulmonary artery. If the bore of the catheter is sufficiently wide to permit rapid injection, the usual dilution of the dye in the right heart is avoided and excellent pictures of the thoracic aorta may be obtained. Owing to the simultaneous presence of dye in the left ventricle, however, contrast patterns of the coronary arteries are difficult to see. A still better method of aortography is achieved by passing a catheter through the radial artery backwards against the blood stream in the aortic arch. If the catheter is passed down to a point just above the aortic valve the contrast substance may be made to fill the coronary vessels during diastole. Remarkably good contrast has been achieved by this means.

The first pictures of the coronary arteries obtained in life were probably produced accidentally in the course of using this method of aortography. It is still doubtful whether the procedure is sufficiently safe to be applied in the early diagnosis of coronary artery disease. A catheter in the neighbourhood of the aortic valves may do serious damage, and should it block a coronary ostium the result may be fatal. In addition to this it should always be kept in mind that angiocardiography, even by the normal intravenous route, has a mortality. Work on this problem is proceeding in a number of different cardiac centres and there is no doubt that interesting and important developments may be expected in the next year or two.

Water-divining

Q.—*My views are often sought on the value of water-divining. Usually the inquirer has a small house in the country with a poor water supply and wants to sink a well in a likely place. He is told that "X" is a reliable water-diviner, and will tell him where to bore. I find that every lay member of the public health and housing committees here has overwhelming confidence in certain local water-diviners. What is the accepted view on this matter?*

A.—There are two ways in which attempts can be made to locate underground sources of water. First, by applying the knowledge acquired from a study of the science of hydrogeology, possibly assisted by geophysics; and secondly by employing those reputed to be skilled in water-divining. The first is soundly based upon scientific observations and a high proportion of successful cases may be expected. The second is best described as an art, the successful practice of which is said to depend upon certain involuntary reactions to external stimuli reputed to emanate not only from water but also from deposits of oil, metallic oils, and other diverse substances. This very diversity may be thought to discount the likelihood of specific stimuli. Undoubtedly, water-diviners are sometimes successful, occasionally spectacularly so. In the present state of our knowledge it is not possible to say to what extent these successes are fortuitous. The consensus among those best qualified to judge is that there is no substantial foundation for the claims of water-diviners, but it should be stated that this is no more than an opinion and that concrete evidence either for or against the water-diviner is lacking.

Investigation of Amenorrhoea

Q.—*What investigations are necessary, what is the treatment, and what is the prognosis in a case of continuing amenorrhoea? This young woman has had two days' menstruation at the age of 18, then again at 19, again at 20, and lastly on her 21st birthday. Since then she has been treated for anaemia without effect.*

A.—The most important investigation is perhaps the routine clinical one comprising a careful history and examination, with particular reference to the presence of any possible psychological causal factor, to past or present general ill-health, and to the development of the general figure and secondary sex characters. Anaemia, unless severe and obvious, is an unlikely cause. On the other hand the oligomenorrhoea may be explained by some apparently insignificant factor such as type of occupation, studying, dieting, or undue concern about the menstrual function. If clinical examination does not give a clear guide the following investigations are indicated: (1) *x*-ray examination of chest to exclude phthisis; (2) estimation of the basal metabolic rate; (3) *x*-ray examination of pituitary fossa; (4) pelvic examination under general anaesthesia with measurement of the uterus and endometrial biopsy. The latter is partly to exclude tuberculosis of the endometrium and partly to assess ovarian function. Hormone assays are of limited value, but if there is any evidence of virilism the excretion of 17-ketosteroids should be estimated. Pregnanediol and gonadotrophin excretion tests are also helpful in certain circumstances. A high gonadotrophin, together with a low oestrogen, excretion rate indicates failure of ovarian rather than of pituitary function. The prognosis and treatment depend entirely on the results of these investigations.

Leeches

Q.—*What are the present-day indications for the application of leeches? For example, can they be used for reducing a large, subcutaneous haematoma?*

A.—Though leeches are still fairly widely used on the Continent, they owe their popularity to traditional folk-lore rather than to any intrinsic merit. The appeal to magic is evident in such practices as the application of leeches to the mastoid process of the apoplectic patient. Given time, and a sufficient number of leeches, a considerable quantity of blood can be removed from a human subject; but venesection is quicker and more effective. It is doubtful whether leeches have sufficient power of penetration to reduce a large subcutaneous haematoma; aspiration, using a syringe and wide-bore needle, is preferable, both technically and aesthetically.

Vitamin B_{12} and Disseminated Sclerosis

Q.—*I have heard that, apart from its therapeutic value for the Addisonian type of anaemia, vitamin B_{12} has been used with some success in disseminated sclerosis. Is this likely?*

A.—The frequency of spontaneous remission in disseminated sclerosis makes clinical trials difficult and no results of any value have been reported either with vitamin B_{12} or with liver extract, which is of course a rich source of the vitamin. Both agents are equally effective in subacute combined degeneration of the cord, but there is no rational basis for expecting an effect in disseminated sclerosis, which is an entirely different disorder.

Tremor in Parkinson's Disease

Q.—*Could I please have some suggestions for the treatment of an ambulant male, aged 62, who is suffering from well-marked Parkinsonism? Tremor is the most trying feature, affecting grossly the left arm and hand, and to a less extent the right arm. Some ineffective control was obtained with "diparcol," but it seemed to cause nausea and gastric discomfort. "Parpanit" is now having little effect, and again he is beginning to complain of gastric disturbances.*

A.—Tremor is the symptom in Parkinson's disease which it is most difficult to influence by treatment. The solanaceous alkaloids in full dosage will often reduce rigidity and make voluntary movement easier, but they rarely help to control tremor. Antihistamine drugs have been claimed to be of value in some cases, and in a small number tremor does seem to be reduced by this treatment, but many derive no apparent benefit. Of the more recently introduced preparations diparcol and parpanit seem to have been relatively ineffective in the particular case under consideration. It would be well worth while to try the effect of "artane" (trihexyphenidyl), which is a most useful drug in the treatment of Parkinson's disease. Rigidity is reduced in the majority of cases when artane is given and in a smaller proportion tremor also becomes less. Artane can be given at the same time as the solanaceous alkaloids or parpanit, and in some patients the best therapeutic results are obtained with a combination of these preparations.

Whooping-cough Vaccine

Q.—*Do you consider that prophylactic inoculation with pertussis vaccine is justifiable in view of the uncertainty of the degree of immunity it produces and the occasional serious sequelae recently reported? Many parents continue to request pertussis immunization for their children.*

A.—The value of immunization against pertussis has been sufficiently proved by American work and by the recent controlled trials in this country to warrant inoculations being given to children whose parents seek to have them immunized against an infection which they know may cause a protracted and debilitating illness. Protection may not be complete, but the inoculated child who contracts pertussis often has a mild infection of short duration which causes no worry to the parents. Serious sequelae following inoculation are extremely rare in this country, and the only contraindications to immunization would be a history of recent convulsions and perhaps the seasonal occurrence of poliomyelitis in the district. It is less easy to advise about the best type of vaccine to use. British manufacturers are nowadays fully aware of the requirements for the preparation of vaccines which will be effective antigens, but unfortunately there is no suitable method of testing the efficacy of a particular vaccine short of the very extensive controlled trial in human volunteers.

Treatment of Hay-fever

Q.—*A male patient, in his mid-thirties, complains of frequent attacks of hay-fever during the summer, especially while on the golf course. He wishes to be desensitized if possible. Where can I get material for patch-testing and desensitizing. How is this undertaken, and are there any special points in technique and interpretation?*

A.—The brief history given here suggests a sensitivity to grass pollen, and this is best confirmed by the scratch method of skin-testing. Two small superficial abrasions are made on the flexor surface of the forearm (without drawing blood), 2 to 3 mm. in length and about 6 cm. apart. Grass pollen extract is gently rubbed into one scratch and the control solution into the other. The reactions are read in 10 to 15 minutes. A typical positive reaction, which is usually obtained in hay-fever subjects, consists of an urticarial weal surrounded by an area of erythema and is much more marked than any reaction around the control. It is too late to consider desensitization this season, for the seasonal method is of doubtful value and is not advised. Local treatment with "antistin-privine" drops or spray (Ciba) will often give temporary relief. A trial of antihistamine drugs, such as anthisan, phenergan (M. and B.), histantin (B. W. and Co.), or thephorin (Roche) is also indicated, for they usually give satisfactory relief in mild or moderately severe cases and will help in almost all cases. If the antihistamine drugs fail to give satisfactory relief this year, then preseasonal desensitization can be carried out next year. Schemes of dosage can be obtained from the standard textbooks—for example, *Textbook of Medical Treatment*, by Dunlop, Davidson, and McNee (E. and S. Livingstone Ltd., Edinburgh). During desensitization it is as well to proceed cautiously, for constitutional reactions, requiring treatment with adrenaline, are not uncommon. The development of a marked local reaction should be an indication for reducing the dose and proceeding more cautiously. The patient should not leave the surgery for half an hour after his injection.

Material for skin-testing and desensitization can be obtained from a number of well-known firms.

Minor Degrees of Toxic Carditis

Q.—*Is it possible to detect minor degrees of heart damage, such as might be expected to occur in a case of influenza in a previously normal adult, by noting slight alterations in the rhythm, tone, or timbre of the heart sounds as heard by a stethoscope alone?*

A.—It is impossible to detect minor degrees of toxic carditis by means of auscultation alone. The only significant auscultatory sign of carditis is gallop rhythm. Minor alterations of rhythm such as bradycardia, tachycardia, ectopic beats, sinus arrhythmia, and nodal rhythm are common in early convalescence in any infection, and are dependent on alterations in autonomic tone.

NOTES AND COMMENTS

Intra-articular Injections for Arthritis.—Mr. W. GRANT WAUGH (Sunderland) writes: Answers to questions must necessarily be brief, and cannot be expected to provide a scientific exegesis of the data on which opinions are based. Nevertheless, when a judgment on any particular method of treatment is given, I believe that the profession is entitled to be informed of the premises on which the judgment is based. In the instance of the reply to questions on "Intra-articular Injections for Arthritis" (May 13, p. 1156) I suggest that the writer discards his anonymity, and indicates: (1) The series of observations on the *p*H content of joints in health and disease on which he founds the view that the "theoretical basis is unsound." (2) The actual number of cases of arthritis of the knee-joints treated by him by the method of acidification (? tens or hundreds) which lead him to state that "it is of no value except perhaps as a placebo." (3) A note of the comparative results of treatment of such cases by other methods, say short-wave diathermy, deep *x*-ray therapy, and hot air. Until an objective examination of the results of various forms of treatment is available, your correspondent's views will tend to be regarded rather as an expression of prejudice than of considered opinion.

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

Authors desiring REPRINTS should communicate with the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors overseas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager, B.M.A. House, Tavistock Square, London, W.C.1 (hours 9 a.m. to 5 p.m.). TELEPHONE: EUSTON 2111. TELEGRAMS: *Britmedads, Westcent, London.*

MEMBERS' SUBSCRIPTIONS should be sent to the SECRETARY of the Association. TELEPHONE: EUSTON 2111. TELEGRAMS: *Medisecra, Westcent, London.*

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.